



JURNAL

GAYA KELEKATAN DAN KONSEP DIRI

Diunduh oleh:

**NURJANNAH
1371041007**

**FAKULTAS PSIKOLOGI
UNIVERSITAS NEGERI MAKASSAR
MAKASSAR
2018**

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The relationship between attachment style, self-concept and academic procrastination

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Abstract:

The aim of this study was to investigate the relationship between attachment style, self-concept, academic procrastination in high school students in the Eastern Bandpay zone of Babol. The study was descriptive and correlational. The sample consisted of 278 students (139 girls and 139 boys) who were selected by cluster sampling and participated in this study by completing Hazan and Shaver attachment style questionnaire, Rogers self-concept test and academic procrastination Talkman 's questionnaire.

The data were analyzed based on correlation and regression analysis. The results showed that there is no significant relationship between attachment style and self-concept. There is no significant relationship between attachment style and academic procrastination. There is a significant inverse relationship between self-concept and academic procrastination. The contribution of attachment style and self-concept is different in predicting academic procrastination.

Keywords: attachment style, self-concept, academic procrastination

Introduction:

One of the important objectives of education is about creating a ground for the full development of the healthy, efficient and responsible people to play a role in individual and social life. Since the students have a special role as pillars of the country's education system, considering this stratum of society causes more fertility and prosperity education and training community (Miller 1982, translated by Mehr Mohamadi). Adolescence is a period of life in which many changes occur in biological, psychological and social of processes and an inclination for establishing an intimate and self-detection relationship increases. And also the feeling of discontinuity causes loneliness and it is coping with the some severe adjustment problems in some teens Lerner spanier 1980;Gelfand & Teti Henwood 1990; Solano 1994; Kalp& Kelimen 1995, quoted from Aghamohamadian and Hosseini). Procrastination composed of two parts that (pro) means ((forward)) and (crast) means (tomorrow) and literally ((until tomorrow)). Synonyms of it include neglect, doubt, delaying and putting off doing something, especially due to habitual carelessness, laziness, procrastination and delay or unnecessary delay(Steel ,2005). This phenomenon encompasses both cognitive and behavioral levels .On the behavioral level, the individual voluntarily does not do the job within the determined time and without any special reason .On the cognitive level the individual delays in taking timely decisions(Chase 2003). ouz & Ferari(2009) know the fear of failure, laziness, risks and rebel against the control as academic procrastination. Self-concept is one of the basic concepts in psychology. According to the theory of self-concept including theories related to self-assessment, self-concept is a network of positive and negative beliefs about ourselves, our acceptance or rejection. In several studies have been conducted on self-concept, this concept has been defined with different terminology and some consider it synonymous with self-esteem and self-regulation (Ahmed & Bruinsma 2006). Humanistic education knows the self-concept as an integral component of learning and growing of student and claims that there is a relationship between positive self-concept and learning and academic performance and knows the teacher's job to provide the perfect ground for a positive self-concept and proper performance for students (Miller 1982, translated by Mehr Mohamadi). Self-concept is transformed by various factors. Feedback of others, particularly parents, social interaction, the relationship between children and the environment and environmental context are the factors that has been discussed by a lot of authors(Pourhossein et al). Bowlby (1973-1980) emphasizes in attachment theory that the relationship in early childhood forms a person's attachment style and affects one's view about themselves, others and organized way of interpersonal communication. According to this view, the effect of attachment persists in life span and explain individual differences on how to deal with the annoyance of internal and regulation of interpersonal relationships. Many developmental psychologists believe the feeling of warmth, trust and security that is the result of secure attachment with primary attachment face provides the adaptive psychological field of action in later stages. In general, according to the results of research conducted in the field of infant attachment styles, Hazan& shaver(1978) presented the adult attachment styles in three categories:1-secure attachment 2- anxious – ambivalent attachment3- avoidant attachment. Bowlby(1977&1988) believed that if child care is not accompanied sensitivity, insecure attachment forms in child and in his internal patterns , people will be unattainable and unreliable .So this child doesn't consider that he deserves care with sensitivity. If this unhealthy perception prevents the formation of supportive interpersonal relationships, the child subject to the risk of some social emotional problems that only children experience these risks. The results indicate that self-detection is more in secure adults than in avoidant adults(Milkulincer & Nachshon 1991). Because

loneliness is associated with a lack of self-detection(stokes1987) so it is expected that the loneliness in secure people reported less than insecure people . The results Mikoliser and Nachshon study (1991) showed that secure people due to satisfactory relationship with others, their loneliness is low, these people respond to others with self-detection and mutually receive more self-detection from the others. Since the procrastination creates the physical and emotional consequences in learners (Munchik et al 1988; quoted by von vik2004) it could create new space for doing research. Researchers have identified several factors associated with procrastination such as hate of doing tasks , fear of failure (Solomon & Rothblum1984), fear of negative evaluation (Ferrari, 1992), bad habits in the study(Ferrari, 1992).Klasen & Karjuk(2007; quoted by Troia 2009) showed with correlation analysis that Procrastination has an inverse relationship with the mean score of students, academic self-efficacy, self-regulation and overall self-esteem. Procrastination leads to high level of anxiety and depression in students and lowers their self-esteem(Lay, 1992; Lay Schouwenburg.H.C, 1993; Lay& Silverman, 1996). As a result of the students' own reports of their work, there is a significant negative correlation with academic performance (Beswick1982). Burka.j.B (1982) noted in a research that the people do procrastinate generally tend to know the consequences of their action originating from their own shortcomings(quoted by Sencal & Koestner). And also Bliksem & Duru' findings on training students in Pamokale university showed that men were more likely to procrastinate. However, research conducted by the attachment style show significant growth in recent years. But despite the consequences of procrastination, few studies have been done in this regard in the country. In this study, considering the importance of attachment styles, self-concept is also considered and we investigate the relationship between attachment styles, self-concept and academic procrastination .

Method:

This descriptive research is correlational. The study population were high school students in Eastern Bandpay part of Babol in the years 93-94. The sample consisted of 278 students(139 boys, 139 girls) upon the Krejci & Morgan table (quoted Hassanzadeh) who were selected by clustering. After explaining the research goals and participation and cooperation of subjects, Hazan and Shaver attachment questionnaire, Rogers self-concept test and Talkman 's questionnaire about students' academic procrastination performed. The data were analyzed based on indicators and statistical methods including correlation and regression analysis and using SPSS software.

Methods of data collection:

A) Adult Attachment Questionnaire:

The new version of Hazan and Shaver attachment questionnaire has been developed in 1993. This questionnaire measures the secure and insecure attachments. The questionnaire consisted of two parts that in the first part (AAQ1) subject give the answer in a seven-point scale to three paragraphs were raised in the form of descriptive sentences. In the second part(AAQ2), he same descriptions raised again, but this time subject suggests its similarity with one of those descriptions only by checking one of them. Internal consistency reliability coefficient through Cronbach's alpha and test-retest reliability coefficient of the questionnaire have been reported 79% and 72% respectively.Basharat used test-retest method to evaluate the reliability of the Adult Attachment Questionnaire that the correlation coefficient between the two test is obtained $T = 0/92$.

B) Rogers self-concept questionnaire (SCQ)

Rogers questionnaire was used to assess self-concept. The questionnaire consisted of two forms A and B. To examine the validity of Rogers self- concept questionnaire(1961) was used Beck self- concept questionnaire(1979, quoted by Hasanzade).In this study, the reliability of the questionnaire through Cronbach's alpha and split-half calculated 74/0 and 65/0 respectively. All validity and reliability coefficients were significant at the level of $P < 0.005$.

C) Procrastination Scale of Talkman

This scale was built by Talkman (1991) and it is composed of 16 articles and a factor. Getting high scores on this scale indicate that procrastination is high

This questionnaire translated by Bayat Moghadas and normalize on students of Azad university in Roodehen and its reliability was 0.73.Talkman (1991)reported the reliability of this questionnaire 0.86 . n this study, Cronbach's alpha was calculated 88.0. In a study Shahni Yeylagh et al determined its validity and estimated it 0.56.

Findings:

4.1 First hypothesis:

There is a relationship between attachment style and self-concept.

Significance level	Pearson Correlation Coefficient	number	Indicators of data
523	.038	278	Attachment Self-concept

Table 4-4: Pearson Correlation Coefficient

As shown in Table 4-4, The correlation coefficient between attachment style and self -concept is equal to .038 that it is not significant at 95% confidence levels. According to the data in the table above, we can conclude there is no significant correlation between attachment style and self-concept component

4.2 The second hypothesis:

There is a relationship between attachment style and academic procrastination.

Significance level	Pearson Correlation Coefficient	number	Indicators of data
.365	-0.054	278	Academic procrastination Self-concept

Table 4-6: Pearson Correlation Coefficient

As shown in Table 4-6, The correlation coefficient between the attachment and academic procrastination is .054 that is not significant at 95% confidence level. According to the data in the table above it can be concluded there is no significant relationship between the attachment style and academic procrastination .

4-3Third hypothesis:

There is a relationship between self-concept and academic procrastination

	Pearson Correlation	number	
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Significance level	Coefficient		Indicators of data
.001	-.206**	278	Academic procrastination Self-concept

Table4-1: Pearson Correlation Coefficient

As shown in Table 4-1, the correlation coefficient between self-concept and academic procrastination is .206 which is significant at 99% confidence level. But given the negative correlation coefficient, it can be concluded there is a significant inverse relationship between self-concept and academic procrastination.

4-4- The fourth hypothesis:

The share of attachment styles and self-concept in predicting academic procrastination is different.

F test significant level	The F test	Adjusted index	coefficient of determination R Square	R Correlation Coefficient	Model
.002a	6.656	.039	.046	.215a	Enter

Table 4-7: Summary of logistic regression model explaining academic procrastination related to measures of attachment and self-concept

A significance level of t	The amount of t	Standard impact factor (Beta)	Outsize impact factor (B)	Variables
.000	11.878	-	3.259	Constant
.295	-1.049	-.062	-.054	Attachment
.000	-3.532	-.208	-.157	Self-concept

Table 4-8: impact factors of regression model explaining academic procrastination related to measures of attachment and self-concept.

Table (4-8) is a multivariate regression analysis including components of self-concept and attachment. Based on the findings of table, the independent variables remained in the equation, simultaneously 0.215 correlated with the dependent variable. Results also show that these variables could explain about 0.04 percent of changes in academic procrastination. And also the beta coefficients indicate that the share of attachment and self-concept is different.

Discussion and conclusion:

The aim of this study was to investigate the relationship between attachment style, self-concept, academic procrastination in high school students in the Eastern Bandpay zone of Babol. The results showed that there is no significant relationship between attachment style and self-concept. Although these findings are consistent with previous research (Goodvin &Thompson &Hayes; 2008 and Nishikawa & Hagglof &Sundbom2010). In fact, this research indicates that the type of attachment style does not affect the self-concept. There is no significant relationship between attachment style and academic procrastination. In fact, this finding suggests that attachment has no effect on academic procrastination and cannot identify academic procrastination of people by the type of their attachment style. There is a significant inverse relationship between self-concept and academic procrastination. These findings are consistent with Hasan Zade et. al(1384).Today, procrastination affected millions of people and is one of the main problems affecting many of us. This is one of the main causes of failure of students in learning and achieving

academic achievement programs. So families can be prevented from their children's academic problems given to this issue and establish a strong self-concept in their children. Multivariate regression analysis showed that the share of attachment and self-concept in predicting procrastination is different. These findings confirm the previous hypothesis that showed there is no significant relationship between attachment style and academic procrastination but there is a significant inverse relationship between self-concept and academic procrastination. Human psychological dimension has an important role in his growth and promotion. Thus, the goals and programs of education must take shape in line with the growth of self-worth and importance of student. Sense of dignity and worth leads to avoid many mistakes and procrastination. A child who feels the intrinsic value and dignity of soul, strives to always maintain his self-esteem and tries not to put himself in a situation that is damaging to his self-esteem. So, such a person probably will use its best endeavors to do better assignments in school. The limits of this research are about not considering some variables such as intelligence, socioeconomic status and the type of attachment style of students. In addition, program planners should have enough attention to elements related to the development of self-concept of students in content and provide refresher (self-learning) courses for teachers with development of self-concept and also families should be well trained in this field. Finally we can reduce the problem of academic procrastination in students.

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Attachment to parents and friends as a context for development of self-concept in adolescence: The personality traits as mediators

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The aim of the research is to study developmental relations between attachment to mother, father and friends and dimensions of adolescents' self-concept. More specifically, we examine if this relation is direct or mediated by some personality construct. A sample of 878 students (13 and 16 years old) from Belgrade urban lower secondary and upper secondary schools participated in this research. Participants completed ECR for mother, father and friend; Self-perception profile for adolescents and NEOFFI. The results have indicated that dimensions of attachment are correlated with dimensions of self-concept, and that they can explain 13% of variance in dimensions of self-concept. When the personality traits are introduced as mediators, attachment dimensions explain only 4.5% of variance in self-concept. The quality of attachment relations with parents is not related to adolescents' self-concept, while attachment to friends is correlated with social dimensions of self-concept. Hence, this study suggests that adolescents with particular parental attachment styles differ according to their self-concept profiles, but that peer attachment is important for adolescents' social self. Beside that, this study reveals significant gender differences: relation between parental and peer attachment and adolescents' self-concepts is not the same for boys and girls.

Keywords: attachment, parents and friends, self-concept, big five personality traits, adolescence

Different theoretical perspectives (social network theory, theory of group socialisation, socio-cultural theory) emphasise that a child does not develop in the dyadic relation just with the mother, but in the broad network of social relations (Arens & Hasselhorn, 2015; Bressoux & Pansu, 2016; Farant & Reese, 2000; Grygiel, Modzelewski, & Pisarek, 2016; Harris, 1998; Lewis, 2005; Newcombe & Reese, 2004; Radišić, Videnović, & Baucal, 2015; Takahashi,

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Acknowledgement. The paper is a part of the project "Identification, measurement and development of cognitive and emotional competences important for a society oriented toward European integrations" (No. 179018) being done by the Institute of Psychology, University of Belgrade, and funded by the Ministry of Science, Republic of Serbia

2005; Thompson, 2005; Weisner, 2005). From this perspective, a number of relations with other people fulfil different child's needs, and the quality of these relations affect different areas of psychological functioning in later life.

At the same time, cross-cultural research shows that a child develops attachment to more than one person, and every relationship is significant for the domain in which it is developed (for example, peers for socialisation, mother for health and physical development, etc.) (Howees, 1999; van Ijzendoorn & Sagi, 2008). Empirical data show that there is a relation between attachment to mother, father and friends and self-esteem, psychological health, social competencies, and adjustment during middle childhood and adolescence (Burke & Weir, 1978; Hoffman, Ushpiz, & Levy-Shift, 1988; Main, Kaplan, & Cassidy, 1985; Suess, Grossman, & Sroufe 1992).

This paper is about adolescents' self-concept development in the context of attachment relationships. Self-concept is defined as cognitive generalisation of oneself, as conscious representation of experience that a person has of oneself, which consists of evaluated perceptions, thoughts and feelings about oneself as an object and a partner in interaction (Damon & Hart, 1991; Harter, 2006). Self-concept is a multidimensional construct. We can distinguish global evaluations of oneself as a person (usually referred to as global self-worth) from evaluations of one's own competencies and attributes in specific domains (academic, cognitive, social...). The number and content of these specific dimensions of self-concept change with age (Harter, 1988; 2006). Until the end of adolescence, self-concept reaches its most complex and comprehensive form.

Self-concept is a social construct. It develops in the context of social interactions with "significant others" (Mead, 1934): parents, friends, teachers. Previous researches have shown that specific dimensions of self-concept depend on specific context and relations with different persons (Krstić, 2002). Hence the idea that the quality of attachment with parents and friends will have effects on adolescents' self-concept.

Previous research on the relation between attachment and self-concept

In the literature which refers to children's or adolescents' self-descriptions and self-evaluations, a number of terms are used: self-concept, self-perception, self-worth, self-esteem, etc. They differ according to theoretical perspective and measuring instruments (Krstić, 2002), which is why it is very difficult to compare results from different studies that use different concepts and different instruments, but describe similar phenomena. In the section below we will present some researches relevant to the topic of this paper.

A number of studies have shown that secure attachment has positive effects on self-worth and self-perception (Cassidy, 1988; Clark & Symons, 2000; Verschueren, Marcoen, & Schoefs., 1996) and on the stability and consistency of self-perception and self-evaluation from childhood to adolescence (Colman & Thompson, 2002; Goodvin, Meyer, Thompson, & Hayes 2008; Easterbrooks & Abeles, 2000).

Generally speaking, secure attachment is found to correlate with more positive self-worth, closer relationships with parents, more positive relations with friends and peers, and better acceptance among peers in adolescence (Allen, Moore, Kuperminc, & Bell, 1998; Sroufe, Egeland, Carlson, & Collins, 2005).

Several studies aimed to investigate relations between attachment to parents and friends with different aspects of self-perception in adolescence. Armsden and Grinberg (1987) found that attachments to parents and to friends are important predictors of self-esteem and life satisfaction in adolescence. Attachment to parents accounted for about 17% of variance of self-esteem and life satisfaction, while peer attachment appeared to be more related to self-esteem (accounting for 9% of variance) than to life-satisfaction (accounting for 6% of variance). Series of studies suggest that attachment to parents is more important than attachment to friends for psychological well-being in adolescence (Raja, Mcgee, & Stanton, 1992). Close and secure relation with parents allows adolescent to experiment and to research, and those behaviours are very important in adolescence (Armsden & Greenberg, 1987; Greenberg, Siegel, & Leitch 1983).

In one study, authors (Wilkinson & Walford, 2001) found that parental attachment but not peer attachment contributed significantly to predicting adolescents' well-being. In another study, using structural equation modelling, it was discovered that the relation between peer and parental attachment and psychological health is mediated by self-esteem (Wilkinson, 2004). In yet another study, it was established that mother attachment was associated with both self-liking and self-competence, peer attachment was significant just for self-liking, and father attachment was insignificant for both measures of self-esteem (Wilkinson & Parry, 2004).

Results also differ regarding developmental changes during adolescence. In one study it was found that the attachment to parents remains important for self-esteem from early to late adolescence (Walker & Green, 1986). However in another study, results indicate that adolescents kept stable quality of affection towards their mothers, but while girls utilised mothers' support more, boys' need for mothers' support and proximity decreased with age. Quality of affection towards father decreased for both adolescent boys and girls, as well as their utilisation of father for support and proximity (Paterson, Field, & Pryor, 1994). Over time, both boys and girls increasingly rely on support and proximity of friends.

Empirical findings regarding the importance of attachment to mother, father and friends for adolescent's self-esteem are inconsistent. Several studies suggest that paternal attachment is the most important (Gecas & Schwalbe, 1986; LeCroy, 1988), especially for boys (Cubis, Lewin, & Dawes, 1989). Findings from other studies, suggest that parental attachment has larger effect than peer attachment, regardless of the age of adolescent (Armsden & Greenberg, 1987; Burke & Weir, 1978; Gecas, 1972; Greenberg et al., 1983). On the other hand, some results suggest that the correlation between attachment to friends and adolescent's adjustment (.54) and self-concept (.47) is greater than correlations of attachment to parents (.38 and .18, respectively) (Cotterel, 1992).

Recently, several meta-analytic studies have shown small-to-medium (0.27) overall correlation between peer attachment and global self-esteem (Gorrese & Ruggieri, 2013), overall effect size linking parental attachment and children's peer relations from $r = .19$ (Pallini, Baiocco, Schneider, Madigan, & Atkinson, 2014), $r = .20$ (Schneider, Atkinson, & Tardif, 2001) to $r = .26$ (Benson, McWey, & Ross 2006), comparable to small to moderate overall effect size of $r = .22$ linking parental attachment and adolescent adjustment (Rice, 1990) and $r = .231$ linking parental attachment and students adjustment (Mattanah, Lopez, & Govern, 2011).

Findings from O'Koon (1997) suggest that parental and peer attachments correlate with different dimensions of self-perception: mother attachment with family relationships (highest obtained correlation .68), then with emotional tone (.30) and psychopathology (.26); father attachment also with emotional tone (.35), family relationships (.53) and mastery of world (.26) and educational goals (.20), while peer attachment was correlated with almost all dimensions except family relationships and educational goals, including body image, social relationships, sexual attitudes, idealism, etc. (correlations range from .24 to .39).

In several cross-cultural studies it was shown that attachment to mother affects self-esteem, well-being (anxiety and loneliness), identity foreclosure, self-confidence, vocational attitudes, and ethnic identity, while attachment to father is important for social functioning in adolescence (Kenny, Griffiths, & Grossman 2005; Leondari & Kiosseoglou, 2000; Matos, Barbosa, De Almeida, & Costa, 1999). Attachment to parents is also correlated with better adjustment in ethnic and racial minority groups among American high-school and college students (Hinderlie & Kenny, 2002; Kenny et al., 2005). Securely attached adolescents have greater self-esteem which leads to greater self-concept clarity (Wu, 2009).

In sum, from the theoretical point of view, a child develops attachment to more than one person (Lewis, 2005; Newcombe & Reese, 2004; Takahashi, 2005; Thompson, 2005; Weisner, 2005), and the quality of those attachment relations affect different areas of psychological functioning in later life (Howees, 1999; van Ijzendoorn & Sagi, 2008). A number of researches have shown that attachment relations are significant for various psychosocial outcomes in adolescence and later life (Burke & Weir, 1978; Hoffman et al., 1988; Main et al., 1985; Suess et al., 1992). Still, results regarding the importance of attachment to mother, father and friends for different aspects of self-perception and self-evaluation are inconsistent (Cotterel, 1992; Gecas & Schwalbe, 1986; Kenny et al., 2005; LeCroy, 1988; Leondari & Kiosseoglou, 2000; Matos et al., 1999; Paterson et al., 1994; Raja et al., 1992; Wilkinson & Parry, 2004; Wilkinson & Walford, 2001). Furthermore, we were unable to find researches relating attachment with dimensions of self-concept defined as evaluations of one's own competencies and attributes in specific domains (academic, cognitive, social...) (Harter, 2006). So the "dilemma" concerning the importance of parental and peer attachment for specific dimensions of adolescents' self-concept still remains.

On the other hand, researches have indicated a correlation between attachment and different personality traits (empathy, prosocial behaviour, aggressive behaviour anxiety, etc.) and some of these traits (self-esteem, empathy, prosocial behaviour) mediate in the relation between attachment and

the quality of peer relations, adjustment or psychological health (Dekovic & Meeus, 1997; Laible, Carlo, & Roesch, 2004; Wilkinson, 2004). Therefore, the relation between attachment relations and different dimensions of psychological functioning could be direct or mediated by personality traits.

The role of personality traits

“The five-factor model“ is an empirically well based framework for explaining large part of individual differences in non-cognitive domain of personality (John & Srivastava, 1999; Knežević, Džamonja-Ignjatović, & Đurić-Jočić, 2004). Consequently, attachment theorists and researchers had to show that attachment variables are not just “clones“ of already existing personality traits. It is empirically proven that individual differences in attachment cannot be reduced to differences in personality traits (Nofle & Shaver, 2006; Picardi, Caroppo, Toni, Bitetti, & Di Maria, 2005; Shaver & Brennan, 1992). Shaver and Brennan (1992) were the first to study correlations between dimensions of attachment and Big five personality traits. They found that attachment anxiety is in positive correlation with neuroticism, but not to the extent that would suggest redundancy of two concepts ($r = .33$). After their study, a number of researchers studied correlations of attachment and Big five personality traits. According to the summary of past findings from 14 studies on attachment dimensions and the Big five, by Nofle & Shaver (2006), results suggest that secure attachment has a moderate negative correlation with Neuroticism, moderate positive correlation with Extraversion and Agreeableness, a small positive with Conscientiousness, and no correlation with Openness to experience (Becker, Billings, Eveleth, & Gilbert 1997; Carver, 1997; Shafer, 2001; Shaver & Brennan, 1992; Wilkinson & Walford, 2001). Results also suggest that attachment anxiety is in moderate to strong correlation with Neuroticism, and in no correlation with Openness (Baekstroem & Holmes, 2001; Becker et al., 1997; Shaver & Brennan, 1992; Shaver et al., 1996). Evidence about relations with the rest of the Big five traits are inconsistent. Attachment avoidance has a small to moderate negative correlation with Extraversion and Agreeableness, and has no correlation with Openness (Baekstroem & Holmes, 2001; Becker et al., 1997; Gallo, Smith, & Ruiz, 2003; Shafer, 2001; Shaver & Brennan, 1992). In some, but not all, studies a positive correlation with Neuroticism and negative correlation with Conscientiousness were established (Nofle & Shaver, 2006).

Additionally, researches have also shown a relation between self-perception and personality traits. However, even though both concepts have been subjects of numerous studies, there are just a few focusing on the relation between personality traits as core, basic dimensions and dimensions of self-perceptions as peripheral, surface personality characteristics. Studies of these relations suggest that self-worth is in negative correlation with Neuroticism, and in positive correlation with Extraversion, and slightly less with Openness to experience, Agreeableness and Conscientiousness. These traits account for 34% of variance of self-worth (Judge, Erez, & Bono, 1998; Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2006; Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001; Watson, Suls, & Haig, 2002). Results

of rare studies of correlations between personality traits and self-perceptions as multidimensional constructs support the idea of existence of multiple dimensions of self-perception and personality traits as moderately correlated but still different dimensions of personality (Marsh et al., 2006). Results suggest that dimensions of self-perception measure something different from personality traits.

Therefore, previous studies indicate that attachment and self-concept are correlated with personality traits, but also that they describe individual differences that cannot be reduced to differences in personality traits. Baron and Kenny (1986) formulated the criteria that must be met in order to consider a variable as a mediator. According to that criteria applied to our example, there are three requirements: attachment and self-concept are correlated, attachment is correlated with personality traits, and self-concept is correlated with personality traits. Research findings mentioned previously imply that all three requirements are met in our case, so the important research question is whether the relation between attachment relationships and dimensions of self-perception is mediated by personality traits.

The present study

On the whole, a large number of researches investigated the relation between attachment and self-concept, self-esteem, self-perception, self-evaluation and similar concepts at various ages. The results are not clear and consistent, leaving some questions unanswered. How are attachment relations with different people (mother, father, friends) related to specific dimensions of self-perception profile? Which dimensions of self-concept are related to specific attachment relations (H1)? Do these complex relations change over adolescence (H2)? Are those relations direct or mediated by personality traits (H3)?

The main aim of the research is to study relations between attachment to mother, father and friends and dimensions of adolescents' self-concept. More specifically, we examine if personality traits mediate this relation between attachment and self-concept in adolescence. Empirical evidence suggests that during adolescence the impact of parents and peers on adolescent's self-concept change (Krstić, 2002). For that reason, the relation between attachment relations and self-concept in this study was examined at the age of early and middle adolescence.

Hypotheses.

- 1) Attachment styles to mother, father and friend are correlated with different dimensions of self-concept: peer attachment will be correlated with social dimensions of self-concept; mother attachment with physical appearance, behaviour and global self-worth; and father attachment with academic and athletic competencies) (Harris, 1998; Thompson, 2005; van Ijzendoorn & Sagi, 2008);
- 2) At older adolescent age attachment to friends will have more effects on self-concept than parental attachment (Krstić, 2002; Bretherton, 1985; Harter, 2006);
- 3) Personality traits will mediate a part of relation between attachment and self-perception (Marsh et al., 2006; Shaver & Brennan, 1992; Picardi et al., 2005).

Method

Sample

This research was conducted on a sample of 878 13 and 16 year-old students (53.4% females) attending lower and upper secondary education in five urban schools in Belgrade.

Variables

Attachment to mother, father and friend; measured as 1) attachment-related dimensions of anxiety and avoidance; and 2) attachment style to each figure: secure attachment style, or insecure dismissing, preoccupied and fearful attachment style.

Adolescent Self-perception profile measured through eight dimensions: Physical Appearance, Scholastic and Athletic Competence, Social Acceptance, Behavioural Conduct, Close Friendship, Romantic Appeal and Global Self-Worth.

Personality traits, according to “the five-factor model”: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness.

Instruments

- I) **Self-Perception Profile for Adolescence** (Harter, 1988). This instrument taps nine self-concept domains, of which eight were used in this research¹: Physical Appearance, Scholastic and Athletic Competence, Social Acceptance, Behavioural Conduct, Close Friendship, Romantic Appeal and Global Self-Worth. There are a total of 40 items, five for each sub-scale. Each item has “a structured alternative format” (Harter, 1982) which consists of two opposite descriptions. The adolescent is asked to decide which description fits him/her better and then he/she decides whether the description is “Really True for Me” or “Sort of True for Me”. Each item is scored on a four-point scale, where score 1 indicates the lowest perceived competence and the score of 4 indicates the highest level of competence (Harter, 1988).
- II) A modified version of **Experience in Close Relationships** (Brennan, Clark, & Shaver, 1998), is a self-report measure of attachment designed to assess attachment-related avoidance and anxiety, and on the basis of their scores, adolescents can be classified into a specific attachment category (secure, dismissing, preoccupied and fearful.) Modified versions used in this research consist of parallel scales designed to measure attachment relationship with mother, father and friend (Kamenov & Jelić, 2003). Each scale consists of 18 Likert-type items (9 for each dimension), and responses range on seven-point scale, where 1 means “Strongly Disagree” and 7 means “Strongly Agree”. This shortened and modified version of questionnaire has kept the two-factorial structure and has a satisfactory reliability (Cronbach’s alpha ranged from .73 to .87).
- III) **NEO FFI** short version of NEO-P-R (Costa & McCrae, 1985; adaptation Đurić-Jočić, Džamonja-Ignjatović, & Knežević, 2004) was used for personality trait assessment. It provides a quick and reliable measure of the five domains of personality: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. It is a 60-item inventory (12 per domain), answered on a five-point Likert scale.

Procedure

After a parental approval and adolescents’ informed consent were obtained, participants were administered questionnaire booklets, which consist of six questionnaires in balanced order (ECR for mother, father and friend, SPP and NEOFFI). The questionnaires were completed in group sessions, during regular school classes, with average testing duration of 60 min for younger and 45 min for older students.

1 The ninth dimension, Job Competence, was not applicable for age-groups studied in this research and it was excluded.

Results

At the beginning we analysed the frequency of different attachment styles in relation to mother, father and friend in our sample of adolescents. As Table 1 shows, our adolescents are predominantly securely attached to all three figures; almost all of them to a friend.

Table 1
Frequency of attachment styles in relation to mother, father and friend

Attachment figure / style	Mother <i>N</i> (%)	Father <i>N</i> (%)	Friend <i>N</i> (%)
Secure attachment	649 (73.9%)	551 (62.8%)	720 (82%)
Preoccupied attachment	50 (5.7%)	42 (4.8%)	92 (10.5%)
Dismissing attachment	157 (17.9%)	245 (27.9%)	54 (6.2%)
Fearful attachment	21 (2.4%)	16 (1.8%)	12 (1.4%)

Distribution of attachment styles is similar to those obtained in previous studies on adolescents (Hanak, 2009; van Ijzendoorn & Bakermans-Kranenburg, 1996), with a somewhat more secure attachment in our sample.

Relation between attachment and self-concept – canonical correlation

To determine the associations between the attachment and dimensions of self-concept, canonical correlation between attachment-related anxiety and avoidance in relation to mother, father and friend, and eight dimensions of self-concept were used. Previous studies have shown that there are gender differences, so canonical correlations were calculated for four subsamples: younger and older, boys and girls.

Table 2
Statistics for the canonical functions

age/gender	canonical roots	<i>r</i>	<i>Wilk's λ</i>	χ^2	<i>df</i>	<i>p</i>
LSS_b	1	.606	.492	144.21	48	.000
	2	.367	.778	50.99	35	.039
LSS_g	1	.609	.487	154.49	48	.000
	2	.414	.773	55.22	35	.016
USS_b	1	.530	.534	111.45	48	.000
	2	.359	.742	53.00	35	.026
USS_g	1	.587	.502	153.92	48	.000
	2	.369	.766	59.61	35	.006

Note. LSS – lower secondary; USS – upper secondary school; b – boys, g – girls

Canonical roots of attachment dimensions explain 9% to 14% of variance of adolescents' self-concept scores. Results show that dimensions of attachment are correlated with dimensions of self-concept, but percentages of explained variance are small. That means that based on the data on attachment we cannot

conclude much about adolescents' self-concept. Moreover, we can see that with the age, the percentage of explained variance decreases (and more for boys), which means that correlations between attachment and self-concepts are smaller at older than on younger adolescent age.

Table 3
Canonical roots and percentage of explained variance

	Age	Total % variance	
		boys	girls
Att-->SC	LSS	.141	.117
	USS	.097	.089

Note. LSS – lower secondary school; USS – upper secondary school;
Att – attachment; SC – self-concept

Analysis of the structure of canonical roots shows that in all four subsamples dimensions defining the first canonical root are peer attachment-related Avoidance and the Friendship and Social acceptance dimensions in the self-concept profile (Appendix). Besides, there are no clear patterns of relations between parental attachments and specific dimensions of self-concept. Comparing attachment to mother and father, we can conclude that attachment to father is less important for self-concept of older adolescents, especially for boys. These results suggest that the quality of attachments to friends affects adolescents' social self-concept while the quality of attachments to parents, and especially to father, does not make much difference in the self-perception profiles of our adolescents.

Relation between attachment and self-concept – multiple regression analysis

In order to perform a thorough study of the relations between given variables, a multiple regression analysis (Enter method) was conducted. When the attachment-related anxiety and avoidance were introduced as predictors, they accounted for only 13% of total variance in dimensions of self-concept (Table 4) (total variance is calculated as the average of all regression coefficients). Percentages of variance which dimensions of attachment explain in every dimension of self-concept range from 0.6% to 3.5% (Table 5). Thus, these results confirm once again that there is a relation, albeit weak, between attachment styles and self-concept profiles in adolescence.

Age differences in relation between attachment and self-concept

Taking all the above results in consideration, we can also analyse age differences in relation between attachment and self-concept. Firstly, as previously stated, the results from canonical correlation show that the percentage of explained variance decreases with age, which means that attachment and self-concept correlations are smaller at older than at younger adolescent age (Table 3).

Furthermore, at the older age canonical factors are defined by fewer dimensions of attachment; dimensions of attachment to father do not participate in the structure of correlations between attachment and self-concept of older boys and in the structure of the first factor for older girls (Appendix). Furthermore, we can analyse age differences in regression analysis for attachment dimensions as predictors of self-concept (Table 5). Still, based on the inspection of the number and values of standardised regression coefficients (β) for attachment dimensions as predictors of self-concept for younger and older adolescents, we cannot draw conclusions regarding age differences. There is no clear pattern which would suggest that with age the importance of peer attachment for adolescents' self-concept increases, as we anticipated.

Relation between attachment and self-concept – personality traits as mediators

The next aim of this study was to analyse whether this relation between attachment and self-concept is mediated by personality traits. The question is which dimensions of attachment are correlated with dimensions of self-concept independently of personality trait? In order to analyse that, a hierarchical regression analysis with three sets of variables was performed. Firstly, personality traits were introduced, followed by dimensions of attachment as predictors of self-concept. Thus it can be concluded what *added* percentage of variance of self-concept can be explained by the dimensions of attachment.

When personality traits are introduced in the prediction, they account for 23% of variance of self-concept dimensions. Subsequently, attachment dimensions explain additional 4.3% of variance in adolescents' self-concept over and above personality traits (Table 4). The largest part of the variance of self-concept dimensions mediated by personality traits comes from attachment-related Anxiety in relations with mother and friend. The correlation between self-concept dimensions and attachment-related Anxiety in relations with mother and friend can be explained by personality traits, especially neuroticism. Interestingly, the dimension of Anxiety with friends remains significant, independently of personality traits, for younger boys, for dimensions Friendship, Self-worth and Athletic competence, and for Social acceptance and Self-worth for older boys. However, that is not the case when it comes to the Anxiety with father. This dimension has significant contribution in five cases and is not mediated by personality traits. Attachment-related Anxiety with father is correlated with dimensions Behavioural Conduct and Friendship for older girls and with Social acceptance, Romantic relations and Physical appearance for younger boys. Still, girls who are less anxious with their fathers have more positive concepts of themselves, while boys who are less anxious in relation with their fathers have more negative concepts of themselves on those three dimensions.

Table 4

Standardised regression coefficients (β) for attachment (Att) and personality traits (NEO) as predictors of self-concept

Self-concept dimension	Age/ gender	R^2 Att	R^2 Att after NEO	R^2 NEO
Scholastic Competence	LSS_b	0.103		0.262
	LSS_g	0.070		0.365
	USS_b	*		0.257
	USS_g			0.216
Social Acceptance	LSS_b	0.163	0.071	0.220
	LSS_g	0.179	0.061	0.299
	USS_b	0.153	0.044	0.379
	USS_g	0.155	0.058	0.272
Physical Appearance	LSS_b	0.132	0.055	0.150
	LSS_g	0.067		0.142
	USS_b	0.114	0.049	0.221
	USS_g			0.189
Romantic Appeal	LSS_b	0.183	0.092	0.191
	LSS_g	0.052		0.248
	USS_b	0.100		0.290
	USS_g	0.058		0.184
Behavioural Conduct	LSS_b	0.082		0.152
	LSS_g	0.115	0.041	0.292
	USS_b	0.063		0.169
	USS_g	0.125	0.071	0.239
Close Friendship	LSS_b	0.207	0.121	0.183
	LSS_g	0.352	0.202	0.207
	USS_b	0.212	0.096	0.201
	USS_g	0.278	0.213	0.104
Global Self-Worth	LSS_b	0.170	0.062	0.281
	LSS_g	0.128		0.383
	USS_b	0.145	0.051	0.431
	USS_g	0.100		0.353
Athletic Competencies	LSS_b	0.167	0.078	0.174
	LSS_g			0.109
	USS_b			0.108
	USS_g			0.114
Total (%)		0.134	0.043	0.231

Note. LSS – lower secondary school; USS– upper secondary school; b– boys; g– girls; Total is a mean value of regression coefficients;

* only significant regression coefficients are shown

The contribution of attachment-related Avoidance in relation to mother, father and friends to total correlations between attachment and self-concept proved to be mostly independent of personality traits. Dimensions of Avoidance in relations with parents have little contribution to total examined correlations. The most significant contribution that one attachment dimension has to total correlation with self-concept is a contribution of attachment-related Avoidance in relation with friends. This dimension contributes to the correlation with Social Acceptance and Friendship for all four adolescents groups, independently of personality traits. Interestingly, the relation of peer Attachment-related Avoidance with Romantic relations for all and Self-worth for boys is totally mediated by personality traits.

Table 5
Standardised regression coefficients (β) for attachment dimensions as predictors of self-concept before and after personality traits (NEO) are introduced

SC	Age/gender	R ²	R ² Alt after NEO	F_avoid	F_avoid after NEO	F_anx	F_anx after NEO	M_avoid	M_avoid after NEO	M_anx	M_anx after NEO	P_avoid	P_avoid after NEO	P_anx	P_anx after NEO
School	LSS_b	0.103		*						-0.187					
	LSS_g	0.070													
	USS_b														
	USS_g														
SocAcc	LSS_b	0.163	0.071			0.181	0.154					-0.296	-0.194	-0.185	
	LSS_g	0.179	0.061		0.126				-0.211			-0.323	-0.198		
	USS_b	0.153	0.044									-0.333	-0.131	-0.215	-0.194
	USS_g	0.155	0.058									-0.374	-0.246		
Physic	LSS_b	0.132	0.055			0.205	0.198			-0.174		-0.206	-0.132	-0.165	
	LSS_g	0.067												-0.172	
	USS_b	0.114	0.049									-0.305	-0.237		
	USS_g														
Roman	LSS_b	0.183	0.092				0.133					-0.366	-0.258		
	LSS_g	0.052										-0.165			
	USS_b	0.100										-0.280			
	USS_g	0.058										-0.226			
Behav	LSS_b	0.082		-0.180											
	LSS_g	0.115	0.041					-0.222	-0.133				0.123		
	USS_b	0.063								-0.260					
	USS_g	0.125	0.071			-0.251	-0.269	-0.238	-0.151						
Friend	LSS_b	0.207	0.121									-0.303	-0.235	-0.233	-0.186
	LSS_g	0.352	0.202									-0.544	-0.462	-0.118	
	USS_b	0.212	0.096									-0.436	-0.332		
	USS_g	0.278	0.213	-0.130	-0.121	-0.144	-0.148					-0.500	-0.475		
Worth	LSS_b	0.170	0.062	-0.167	-0.183							-0.157		-0.210	-0.126
	LSS_g	0.128						-0.188						-0.221	
	USS_b	0.145	0.051		0.223			-0.179				-0.236		-0.181	-0.119
	USS_g	0.100												-0.182	
Athlet	LSS_b	0.167	0.078									-0.321	-0.224	-0.193	-0.139
	LSS_g														
	USS_b														
	USS_g									0.275					

Note. LSS – lower secondary school; USS-upper secondary school; b– boys; g– girls; F-avoidance/ anxiety related to father; M– avoidance/anxiety related to mother; P– avoidance/anxiety related to friend; School– School Competencies; SocAcc – Social Acceptance; Physic– Physical Appearance; Roman– Romantic Appeal; Behav– Behavioural Conduct; Friend– Close Friendship; Worth– Global Self-Worth; Athlet– Athletic Competencies.

Discussion

The aim of the research was to study relations between attachments to mother, father and friends and dimensions of adolescents' self-concept profiles, and the role personality traits have in that relation. Results show that there is a correlation, albeit weak, between attachment-related Anxiety and Avoidance and dimensions of self-concept in adolescence. Based on that it can be concluded that attachment influences adolescents' self-concepts, but based on attachment style we cannot say much about the profiles of adolescents' self-concept. The correlation of those two sets of dimensions is too small, hence specific self-concept profiles cannot be described based on the attachment styles of adolescents.

That implies that individual differences between self-concept profiles are too large even in a group of securely attached adolescents. This results could be a consequence of a large number of secure attachment styles in our sample in all three relations; consequently it is difficult to determine specific profiles. On the other hand, although attachment styles indicate specific internal working models of self and others, and results suggest that attachment styles have impact on self-concept, there are numerous domains of psycho-social functioning where different competencies could be displayed, or sources of pleasure and self-realisation found. This is particularly true in adolescence, when self-concept is developing and changing from one moment to another, from one context to another (Elliot & Feldman, 1990; Kimmel & Weiner, 1995; Noller & Callan, 1991). In previous study we found that adolescents' self-concept depends on representations of how significant others (parents and friends) see them (Krstić, 2008), but it seems it is independent of the quality of attachment with those significant others, *per se*.

The percentage of the explained variance of self-concept decreases with age, so the influence of attachment is smaller at the age of 16–17. The adolescents' self-concept is less dependent on the quality of relations with others in middle adolescence, and especially for boys. Besides, we could not find other age differences in relation between adolescents' self-concept and their attachment relations with different people. Previous studies suggest there are age differences in the importance of representations of how peers see them (Krstić, 2008), or utilisations, reliance on support and proximity of friends (Paterson et al., 1994), which is not in accordance with findings from this study. It seems that although importance of friends and of peer attachment increase over age, adolescents' self-concept does not depend on the quality of relations with friends but more on the cognitive aspects of social feedback they receive from peers.

The relation between attachment styles and self-concept in adolescence is mainly based on the relation between attachment-related Avoidance with friends and social dimensions of self-concept. This finding once again stresses the importance of friendships and peer relations as a secure base in adolescence (Ainsworth, 1989; Allan, 2008; Cassidy, 2001; Waters & Cummings, 2000). Friends in adolescence could serve as a secure base and as a base for developing

a positive model of self, but also for experimentation and research which are immensely important for identity development in adolescence. Adolescents who are securely attached to friend, and especially if they are also securely attached to one of their parents, tend to have higher self-worth and more positive perception of themselves on all or most dimensions of self-concept.

Although researchers have found specific effects of attachment to mother or to father on different aspects of psycho-social functioning in adolescence (Howees, 1999; van Ijzendoorn & Sagi, 2008), these differences were not confirmed in this study. The relation between parental attachment and particular dimensions of self-concept was not discovered in this research. This discrepancy may be due to the different instruments used for measuring either self-concept or attachment, or due to the age and gender differences neglected in previous studies. Attachment to mother is shown to be more important for adolescents' self-concept, especially in early adolescence, while attachment to father has an effect only on self-concept of girls. Therefore, these results do not contribute to the dilemma regarding the importance of attachment to different persons and the importance of parental and peer attachment for specific dimensions of self-concept (Lempers & Clark-Lempers, 1992; O'Koon, 1997; Paterson et al., 1994; Suess et al., 1992).

One of the findings from this study deserves special attention: the relation between attachment to parents and friends and adolescents' self-concepts is not the same for boys and girls and these gender differences should be studied more profoundly. Studies on gender differences in attachment revealed very mixed results (Kenny & Rice, 1995; Laible et al., 2004; Song et al., 2009; Wilkinson, 2004), particularly regarding the relation between parental and peer attachment and adolescents' self-concept (Cubis et al., 1989; Song et al., 2009). These findings were not elaborated here in detail, but they indicate that we could not speak about a relationship between attachment and adolescents' self-concept independently of gender. Gender differences in attachment and self-concept represent an important topic which deserves special attention in further research.

Regarding the role of personality traits, results of this study suggest that the relations between attachment and self-concept are largely mediated by personality traits. Attachment-related Anxiety in relation to mother and friend can be explained almost completely by neuroticism, but Anxiety in relation to father is dependent on the real quality of interaction with a father. Attachment-related avoidance is independent of personality traits and it is a reflection of dyadic relation. Our findings indicate that there is a small correlation between attachment-related dimensions and self-concept in adolescence that is independent of personality traits.

These results go in line with the ideas about the significance of social relation for the self-concept of adolescence. This study is in concordance with the assumptions about importance of "the looking-glass self" (Cooley, 1902; Mead, 1934; Opačić, 1995) for adolescents' self-concept, especially for girls. During adolescence the relations with and feedback from peers and

friends become particularly important (Krstić, 2002; 2008; Harter, 2006). The attachment to parents and friends has an impact on adolescents' self-concept, but that influence is largely mediated by personality traits. Neuroticism as a personality trait explains the effect of attachment-related Anxiety with mother and friend on adolescents' self-concept. On the other hand, Anxiety with father is independent of personality traits. It seems that the nature and meaning of attachment-related Anxiety varies in different relations. While Anxiety in relation with mother and friends, as an internal working model of oneself in those relations, can be explained with more basic tendency towards negative emotions, Anxiety in relation with father is less based on basic personality traits and more a reflection of specific experience of oneself in everyday interactions with the father. It might be assumed that tendency towards negative emotions will lead to more frequent activation of attachment activity, and that adolescents with high scores on neuroticism will need a safe haven or a secure base more often and probably will worry more about availability of mother or a friend (Crawford, Shaver, & Goldsmith, 2007). Mother is a primary attachment figure, but in the course of adolescence friends become more and more important; adolescents need their closeness, support, security, hence those who are prone to negative emotions will worry more about their availability and will react more negatively when experiencing an inadequate response. On the other hand, father has less importance as an attachment figure. In attachment to father, we have got the least securely attached adolescents, and the most dismissing styles, in comparison to attachments to mother and friends. It can be assumed that those who are prone to negative emotions will not be anxious in relation with father but will avoid closeness with him in order to avoid to be hurt or left alone.

Conclusion

The focus of the research was to study relations between attachment to mother, father and friends and dimensions of adolescents' self-concept, and the role of Big five personality traits as mediators. Findings suggest that there is a correlation, albeit weak, between dimensions of attachment and dimensions of self-concept, and that correlation is independent of personality traits and decreases during adolescence. The quality of attachments to parents cannot predict the profile of adolescents' self-concept, while attachment to friends is correlated with social dimensions of self-concept. There are significant gender differences in the relations between attachment and self-concept.

Limitations of this study involve methodological issues. Although we utilised the most commonly used questionnaires, operationalisation and measuring of both attachment and self-concept represents just one of numerous possible ways. As discussed earlier, this makes comparison of results difficult. Therefore, the question of relations between attachment and self-concept remains unanswered. Results suggest that in investigating these relations we should be sensitive to gender and age differences. In this study we got a very large number of adolescents securely attached to friends, which raises the question of

whether this questionnaire, method and design of investigating peer attachment are sensitive enough to reveal small and fine differences in the quality of peer attachment relations.

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RECEIVED 16.06.2016.

REVISION RECEIVED 15.11.2016.

ACCEPTED 15.11.2016.

Appendix

Structure of canonical factors

Age/gender	Canonical root	Attachment dimension	Canonical loadings	Self-concept dimension	Canonical loadings
LSS_b	1. canonical root	P_avoidance	-.822	Friendship	.700
		P_anxiety	-.581	Athletic Comp.	.654
		M_anxiety	-.439	Romantic Appeal	.652
		F_avoidance	-.439	Social Acceptance	.651
		M_avoidance	-.286	Self-Worth	.631
		F_anxiety	-.115	Physical App.	.566
	2. canonical root	F_anxiety	-.749		
		M_avoidance	-.542	Scholastic Comp.	.560
		M_anxiety	-.531	Behavioral Conduct	.426
		P_anxiety	-.399	Romantic Appeal	-.420
		F_avoidance	-.311		
		P_avoidance	.241		
LSS_g	1. canonical root	P_avoidance	-.951	Friendship	.973
		M_anxiety	-.356	Social Acceptance	.661
		P_anxiety	-.327	Romantic Appeal	.330
	2. canonical root	M_avoidance	-.815	Behavioral Conduct	.806
		P_anxiety	-.680	Self-Worth	.716
		F_avoidance	-.525	Physical App.	.510
		M_anxiety	-.373	Scholastic Comp.	.509
		F_anxiety	-.277		
USS_b	1. canonical root			Friendship	.824
		P_avoidance	-.888	Social Acceptance	.676
		M_anxiety	-.464	Self-Worth	.641
		P_anxiety	-.388	Physical App.	.598
	2. canonical root			Romantic Appeal	.578
		M_anxiety	.678	Athletic Comp.	.648
		P_avoidance	-.368	Behavioral Conduct	-.458
		P_anxiety	.306	Friendship	.364
		M_avoidance	.266		
USS_g	1. canonical root	P_avoidance	.953	Friendship	-.887
		M_avoidance	.398	Social Acceptance	-.631
				Romantic Appeal	-.391
	2. canonical root	P_anxiety	-.590		
		M_avoidance	-.569	Behavioral Conduct	.822
		F_anxiety	-.511	Self-Worth	.581
		M_anxiety	-.458	Scholastic Comp.	.519
		F_avoidance	-.428		

Note. LSS – lower secondary school; USS-upper secondary school; b– boys; g– girls; F_avoidance/anxiety related to father; M_avoidance/anxiety related to mother; P_avoidance/anxiety related to friend;

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Attachment Style

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Attachment theory, developed by Bowlby to explain human bonding, has profound implications for conducting and adapting psychotherapy. We summarize the prevailing definitions and measures of attachment style. We review the results of three meta-analyses examining the association between attachment anxiety, avoidance, and security and psychotherapy outcome. Fourteen studies were synthesized, which included 19 separate therapy cohorts with a combined sample size of 1,467. Attachment anxiety showed a d of $-.46$ with posttherapy outcome, while attachment security showed a d of $.37$ association with outcome. Attachment avoidance was uncorrelated with outcome. The age and gender composition of the samples moderated the relation between attachment security and outcome: samples with a higher proportion of female clients and a higher mean age showed a smaller relation between security and outcome. We discuss the practice implications of these findings and related research on the link between attachment and the therapy relationship. © 2010 Wiley Periodicals, Inc. *J Clin Psychol: In Session* 67:193–203, 2011.

Keywords: psychotherapy; client characteristics; attachment; meta-analysis; therapy relationship; treatment adaptation

Attachment style or organization is a concept that derives from John Bowlby's attachment theory and refers to a person's characteristic ways of relating in intimate caregiving and receiving relationships with "attachment figures," often one's parents, children, and romantic partners. The concept involves one's confidence in the availability of the attachment figure for use as a *secure base* from which one can freely explore the world when not in distress as well as a *safe haven* from which one can seek support, protection, and comfort in times of distress. Exploration of the world includes not only the physical world but also relationships with other people and reflection on one's internal experience.

From its inception, Bowlby (1982) conceptualized attachment theory as guiding clinical practice. Consistent with this idea, there has been increased interest in the application of an attachment theory perspective to psychotherapy (see Berant & Obegi, 2009; Levy & Kelly, 2009, for reviews). Bowlby not only suggested that the psychotherapist can become an attachment figure for the client, but also thought it was important for the therapist to become a reliable and trustworthy companion in the patient's exploration of his or her experiences. Secure attachment behaviors in psychotherapy include the use of the therapist as a secure base from which the individual can freely reflect on his or her experience, reflect on the possible contents of the minds of significant others, and explore the possibility of trying new experiences and engaging in novel behaviors. Additionally, Bowlby discussed patients turning to the therapist as a safe haven for comfort and support in times of distress. A number of clinical theorists have elaborated upon Bowlby's ideas about the function of attachment within the therapeutic relationship (e.g., Farber, Lippert, & Nevas, 1995; Farber & Metzger, 2009; Obegi, 2008).

The association between adult attachment and psychotherapy has been conceptualized and examined both with attachment as an outcome variable and with attachment as a moderator

This article is adapted, by special permission of Oxford University Press, from a chapter of the same title by the same authors in J.C. Norcross (Ed.), 2011, *Psychotherapy Relationships That Work* (2nd ed.). New York: Oxford University Press. The book project was cosponsored by the APA Division of Clinical Psychology and the APA Division of Psychotherapy.

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of treatment outcome. Early findings suggest that patient attachment status may be relevant to the course and outcome of psychotherapy and may also change as a result of psychotherapy. A recent review of this literature (Berant & Obegi, 2009) concluded that securely attached clients tend to benefit more from psychotherapy than insecurely attached clients. However, the findings across these studies have been variable, with some studies suggesting that securely attached clients may not necessarily show more improvement in treatment compared with insecurely attached clients (Cyranowski et al., 2002; Fonagy et al., 1996). In addition, the strength of the relation between attachment security and treatment outcome remains unclear.

In this article, we attempt to clarify the strength of that relation through a meta-analysis of the research on the association between clients' pretreatment attachment style and psychotherapy outcome. We begin by reviewing the prevailing definitions and measures of adult attachment style. We then summarize three separate meta-analyses. We hypothesized that attachment anxiety would be negatively related to outcome, that attachment avoidance would be negatively related to outcome, and that attachment security would be positively related to outcome. Because research on attachment is converging on the notion that the two dimensions of avoidance and anxiety underlie adult attachment, we decided to focus on these dimensions instead of the individual attachment categories, which evidence more variability among assessment methods. In addition, we examined attachment security (which can be conceptualized as a blend of avoidance and anxiety dimensions) because it has often been the focus of psychotherapy research. We conclude the article by noting the major limitations of the research reviewed and by advancing research-supported therapeutic practices.

Definitions and Measures

Based on Bowlby's theory, Ainsworth, Blehar, Waters, and Wall (1978) developed a laboratory method called the Strange Situation to evaluate individual differences in attachment security in infants. This method includes a series of laboratory episodes staged in a playroom, through which the infant, the caregiver, and a stranger interact and the behaviors of the infant are observed. Special attention is paid to the infant's behavior upon reunion with the caregiver after a brief separation. Ainsworth (Ainsworth et al., 1978) identified three distinct patterns or styles of attachment, which have since been termed *secure* (63% of the dyads tested), *anxious-resistant* or *ambivalent* (16%), and *avoidant* (21%).

Stemming from Bowlby's contention that the attachment system remains active throughout the lifespan, various investigators in the mid-1980s began to apply the tenets of attachment theory to the study of adult behavior and personality. Because these investigators worked independently, they often used slightly different terms for similar constructs or focused on different aspects of Bowlby's and Ainsworth's writings.

Mary Main and her colleagues developed the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985; Main, Kaplan, & Cassidy, 1985), a 1-hour attachment-history interview, noting that features in interviews with parents of infants reliably predicted the Strange Situation behavior of their children. The interview inquires into "descriptions of early relationships and attachment and adult personality" (Main et al., 1985, p. 98). Three major patterns of adult attachment were initially identified: *secure/autonomous*, *dismissing*, and *enmeshed/preoccupied*. More recently, two additional categories have been identified: *unresolved* and *cannot classify*. The first three categories parallel the attachment classifications originally identified in childhood of secure, avoidant, and anxious-resistant (Ainsworth et al., 1978), and the unresolved classification parallels a pattern Main later described in infants that she called *disorganized/disoriented* (Main & Solomon, 1986). A number of studies found that AAI classifications based on individuals' reports of interactions with their own parents could predict their children's Strange Situation classifications (see van IJzendoorn, 1995, for a review).

Hazan and Shaver (1987) extrapolated the childhood attachment paradigm to study attachment in adulthood by conceptualizing romantic love as an attachment process, translating Ainsworth's patterns into a paper-and-pencil prototype-matching measure of adult attachment styles. Bartholomew (1990) and Bartholomew and Horowitz (1991) revised Hazan

and Shaver's three-category classification scheme, proposing a four-category model that differentiated between two types of avoidant styles: fearful and dismissing.

In an effort to develop a definitive measure of adult attachment and respond to the proliferation of attachment measures, Brennan, Clark, and Shaver (1998) created the Experiences in Close Relationships (ECR) scale, which was derived from a factor analysis of previously existing measures. The factor analysis revealed that the ECR's dimensions of anxiety and avoidance underlie most measures of adult attachment style.

Clinical Examples

Secure Attachment

Given that secure individuals are more open to exploring their surroundings and relationships, it is not surprising that evidence suggests that they tend to be (a) open, collaborative, compliant, committed, and proactive in treatment, (b) trusting of therapists, and most important, (c) able to integrate their therapists' comments ([Dozier, 1990](#); [Korfmacher, Adam, Ogawa, & Egeland, 1997](#); [Riggs et al., 2002](#)).

Preoccupied Attachment

Because preoccupied individuals can be so interpersonally engaged, they often initially appear to be easier to treat. Preoccupied individuals are often eager to discuss their worries and relationship difficulties as well as their own role in these problems ([Dozier, 1990](#)). Because the chaotic and contradictory representations of self and others of individuals classified as preoccupied are so rich, they may be more readily mentalized by the therapist. However, both clinical and empirical evidence suggests that these individuals may be difficult to treat. Preoccupied clients, despite tending to present themselves as needy, are no more compliant with treatment plans than dismissing individuals ([Dozier, 1990](#)), and they tend to show less improvement ([Fonagy et al., 1996](#)).

Dismissing Attachment

Dismissing patients are often resistant to treatment, have difficulty asking for help, and retreat from help when it is offered ([Dozier, 1990](#)). Indeed, dismissive patients often evoke countertransference of being excluded from their lives ([Diamond et al., 1999](#); [2003](#)). In our pilot study ([Clarkin et al., 2001](#)), a patient classified as dismissive came into session one morning and announced, to her therapist's surprise, that she was getting married that afternoon. Although he had known of her engagement, it had been many months since she had brought up any aspect of her upcoming marriage. Additionally, dismissing individuals often become more distressed and confused when confronted with emotional issues in therapy ([Dozier, Lomax, Tyrrell, & Lee, 2001](#)). Another dismissive patient, when reflecting on her experience in therapy, stated:

[The therapist] would start digging into things and find out why I was angry, and then I would realize something really made me mad, but I didn't want to be mad. With my parents, for example, I didn't want to be angry at them.

"Unresolved for Trauma or Loss" Attachment

This classification is unique in that it is given to an individual in addition to one of the organized attachment patterns. Clinical writers have suggested that it can be very difficult to treat those patients who are unresolved for trauma or loss on the AAI. In two studies it was found that between 32% and 60% of patients with borderline personality disorder (BPD) were classified as unresolved ([Diamond et al., 2003](#); [Levy et al., 2006](#)). In a randomized clinical trial ([Levy et al., 2006](#)), we found a nonsignificant decrease from pretreatment to posttreatment in

the number of patients classified as unresolved (32% vs. 22%). However, in a small sample of women with childhood sexual and physical abuse-related posttraumatic stress disorder (PTSD), 62% of unresolved patients lost their unresolved status after treatment (Stovall-McClough & Cloitre, 2003).

Meta-Analytic Review

Inclusion Criteria and Search Strategy

Eligible studies were published reports of psychotherapy outcome in samples of treatment-seeking individuals. These studies were found through articles reviewing the literature (e.g., Berant & Obegi, 2009) and through a series of PsycINFO searches. These searches, conducted in December 2009, used the intersections of the terms attachment, interpersonal style, relation* style, or the name of an attachment measure with either therap* outcome, psychotherap* outcome, or outcome. The search initially returned 10,155 results. After foreign-language studies (531), dissertations (8), and studies that did not include treatment trials (9,448) were excluded, 168 articles remained. Many of these were irrelevant to the topic at hand; only studies that measured attachment and treatment outcome were included.

To be included in the meta-analyses, studies had to report statistics showing the relation between patients' pretreatment attachment security, anxiety, and/or avoidance to outcome posttreatment. For many identified studies, statistics describing the relation between attachment and outcome were not directly available from the published report, in which case the authors of the study were contacted via e-mail and asked to provide these statistics. The corresponding authors of 15 primary studies were contacted, of which 10 responded with suitable statistics. Our final pool of studies analyzed comprised 14 studies, which contained 19 separate therapy samples with a combined *N* of 1,467. Table 1 lists the studies included in the meta-analysis along with relevant characteristics of their designs and samples.

Independence of Effect Size Estimates

Effect sizes (ESs) were considered independent if they described results from separate samples. In one case, relevant information from a single sample was available from multiple research reports (Kirchmann et al., 2009; Strauss et al., 2006), so only one statistic was drawn from these reports. In other cases, separate statistics from multiple samples (for example, different treatment groups) were presented in the same publication (Levy et al., 2006; McBride, Atkinson, Quilty, & Bagby, 2006; Stalker, Gebotys, & Harper, 2005; Tasca et al., 2006). For these studies, multiple ES estimates were coded and treated as independent.

Several studies provided statistics relating attachment to more than one outcome measure. These estimates were not considered independent because they were derived from the same sample and are thus likely to display substantial intercorrelation. Because we had no *a priori* reason to consider any one of these estimates representative of the study's "true" ES, multiple ES estimates from the same study were transformed to *Z* scores (Hedges & Olkin, 1985), averaged, and then back-transformed and treated as a single ES.

Study Coding

Several patient characteristics were coded, including the proportion of the sample that was female, mean age of the sample, proportion of the sample that was White, and whether the primary diagnosis of the sample was an Axis I disorder (e.g., major depressive disorder) or an Axis II disorder (e.g., borderline personality disorder). The treatment characteristics coded included theoretical orientation (cognitive-behavioral or psychodynamic therapies) and length of treatment in weeks. The operationalization of attachment was coded for its degree of approximation to attachment avoidance and attachment anxiety, and attachment measures were coded for rater (client-rated or observer-rated attachment). Finally, the following therapist variables were coded: mean years of experience, proportion of therapists in the study that was female, and student status.

Table 1
Continued

Study	Patients			Attachment		Therapy		Outcome		
	<i>N</i>	% Female	Age (<i>M</i>)	Diagnosis	Measure	Rater	Orientation	Duration (weeks)	Measure	Rater
Saatsi et al. (2007)	82	72.7	34.92	MDD	Vignettes	C	CB	14	BDI	C
Stalker et al. (2005)	114	100	40.6	PTSD	RAQ	C	D	6	SCL-90-R	C
	18	100	40.6	PTSD	AAQ	C	D	6	MPSS-SR	C
									SCL-90-R	C
									MPSS-SR	C
Strauss et al. (2006)	476	70	34.4	PD	AAPR	NT	D	10	SCL-90-R	C
									IIP	C
Tasca et al. (2006)	33	100	42.75	BED	ASQ	C	CB	16	EDEbinge	NT
	33	100	42.75	BED	ASQ	C	D	16	EDEbinge	NT
Travis et al. (2001)	59	59	41	Unspecified	BARS	NT	D	21	SCL-90-R	C

Note. Raters: C = client; NT = nontreater; T = therapist. Orientations: CB = cognitive-behavioral; D = dynamic; E = eclectic; I = integrative. Diagnoses: BED = binge eating disorder; BPD = borderline personality disorder; IPV = intimate partner violence; MDD = major depressive disorder; PD = personality disorder; PDNOS = personality disorder not otherwise specified; PTSD = post-traumatic stress disorder. Attachment measures: AAPR = Adult Attachment Prototype Rating; AAI = Adult Attachment Interview; AAS = Adult Attachment Scale; AAQ = Avoidant Attachment Questionnaire; AQ = Attachment Questionnaire; ASQ = Attachment Style Questionnaire; BARS = Bartholomew Attachment Rating Scale; ECR/ECR-R = Experiences in Close Relationships scale/Experiences in Close Relationships-Revised; RAQ = Reciprocal Attachment Questionnaire; RSQ = Relationship Scales Questionnaire; RQ = Relationship Questionnaire. Outcome measures: BDI = Beck Depression Inventory; DASSatis = satisfaction subscale of the Dyadic Adjustment Scale; EDEbinge = Eating Disorder Examination assessment of days binged; GAF = Global Assessment of Functioning; HAMA = Hamilton Rating Scale for Anxiety; HAM-D = Six-Item Hamilton Depression Rating Scale; HRSD = Hamilton Rating Scale for Depression; IIP = Inventory of Interpersonal Problems; MPSS-SR = Modified PTSD Symptom Scale-Self-Report; psyaubse = psychological abuse subscale of the Conflict Tactics Scale; SCL-90-R = Symptom Checklist-90-Revised; TSC-40 = Trauma Symptom Checklist-40; violence = subscale of the Conflict Tactics Scale.

ES Estimates

The ES statistic used for the current meta-analysis was the Pearson product-moment correlation coefficient (r), describing the relation between attachment variables and posttreatment outcome measures. In some cases, statistics relating attachment to outcome took other forms, such as means and standard deviations for different attachment groups on outcome measures, t tests of these values, or tables showing categories of outcome (e.g., how many individuals had achieved a certain symptom score) by attachment group. In these cases, statistics were transformed to r values (using formulas presented in Lipsey & Wilson, 2001). Although it would be optimal to control for pretreatment correlations between attachment and symptom scales, this was not feasible because of inconsistent reporting among studies. Thus, all correlations used in the current analyses were zero-order correlations between pretreatment attachment and posttreatment outcome.

The statistics for the 14 primary studies were adjusted for two factors that could be expected to impart a systematic bias onto ES estimates. First, each study was adjusted to account for differences in operationalization of attachment. The analysis focuses on attachment security and the underlying attachment dimensions of avoidance and anxiety, and when measures provide an imperfect assessment of these constructs, the resulting ES estimate is attenuated (Schmidt, Le, & Oh, 2009). Therefore, each study was corrected to account for how closely its attachment measure approximated these dimensions of attachment. In order to do this, each observed ES was divided by a correlation value, which was culled from the available literature (Brennan et al., 1998; Tsagarakis, Kafetsios, & Stalikas, 2007), of the attachment measure used in the study with the ECR. Because of the method of its development, the ECR was assumed to measure attachment anxiety and attachment avoidance with the most fidelity. Additionally, it has repeatedly shown strong reliability and validity (Brennan et al., 1998; Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010).

A second correction was applied to account for artificial dichotomization of attachment dimensions or dimensional outcome constructs, which also attenuates ES estimates (Schmidt et al., 2009). Hunter and Schmidt's (1990) correction to these values was thus applied. To ensure that more valid estimates contributed more to the overall mean than estimates for which these two artifact corrections were large, each ES estimate was weighted not only by sample size but it was also assigned a weight based on the size of the two artifact corrections (Hunter & Schmidt, 2004; Schmidt et al., 2009).

Analyses

The mean ES was computed as a weighted average of each independent sample's correlation coefficient. The weights comprised two coefficients: the sample size, so that each study's contribution to the overall mean would be inversely proportional to sampling error, and a multiplier based on the artifact corrections made to each ES, so that studies that more nearly approximated the constructs of interest were weighted more heavily (Hunter & Schmidt, 2004; Schmidt et al., 2009). Random effects modeling was used for each analysis, given the multiple sources of variability between studies and the resultant implausibility of fixed-effects models.

For all three attachment dimensions, homogeneity of ES estimates was tested by means of Hunter and Schmidt's (2004) 75% criterion, which estimates the amount of variance in ESs that is due to artifacts. If this value is more than 75% of the total variance, then a search for measureable moderators of the ES may be unproductive, because the remaining variance in ESs is comparatively small. This method was used because homogeneity tests based on a null hypothesis of homogeneity (such as the Q statistic) would likely have little power given the small number of studies in the meta-analyses.

Results

The mean weighted r between attachment anxiety and psychotherapy outcome was $-.224$ (Cohen's weighted $d = -.460$). Outcomes were coded so that higher numbers reflected better

outcome. Thus, higher attachment anxiety predicted worse outcome after therapy. The 80% credibility interval around this estimate ranged from $-.158$ to $-.291$ ($d = -.320$ to $-.608$).

The mean weighted r between attachment avoidance and treatment outcome was $-.014$ ($d = -.028$), with an 80% credibility interval of $-.165$ to $.136$ ($d = -.335$ to $.275$). This suggests that attachment avoidance had a negligible overall effect on outcomes in psychotherapy.

The mean weighted r between attachment security and outcome was $.182$ ($d = .370$), with an 80% credibility interval of $.042$ to $.321$ ($d = .084$ to $.678$). Thus, higher attachment security predicted more favorable outcomes in psychotherapy.

The influence of outliers was a concern because the meta-analysis involved a small but heterogeneous sample of primary studies. Outliers were detected by means of the sample-adjusted meta-analytic deviancy (SAMD; Huffcutt & Arthur, 1995) statistic. No outliers could be identified among the primary studies' estimates of the relation between outcome and attachment anxiety, avoidance, or security. Therefore, all values were retained for further analyses.

Moderators and Mediators

For all three attachment dimensions, we tested for homogeneity of ES estimates by means of Hunter and Schmidt's (2004) 75% criterion. These analyses indicated that a substantial proportion of the ES estimates was indeed artifactual (see Levy, Ellison, Scott, & Bernecker, 2011, for details). We followed with an exploratory analysis of potential moderators.

Unfortunately, for a number of the coded variables, the effects of moderators could not be estimated because data about them were not available, or because there was not enough variance among the primary studies on the moderator variable. For two examples, the moderating influence of sample ethnicity and therapist level of experience could not be estimated because of insufficient data or variability.

No moderators were found to influence the size of the relation between either attachment avoidance and treatment outcome or attachment anxiety and treatment outcome.

However, two sample-level moderators did significantly influence the effect of attachment security on outcome. Both the proportion of females ($Z = 2.78$, $p < .01$) and the mean age ($Z = 2.02$, $p < .05$) of the patients exerted an effect, such that the more female and older the sample, the smaller the observed relation between security and outcome. We suspect that the effect of gender can be explained by one study (Cyranowski et al., 2002), which included only women and found the weakest relation between security and outcome. In fact, running the analysis without including this study completely erased the significant gender effect, with a regression coefficient of nearly zero. Nonetheless, there are gender differences in attachment (i.e., studies suggest that more men than women demonstrate insecure and dismissing attachment styles; e.g., Bartholomew & Horowitz, 1991; Levy, Blatt, & Shaver, 1998; Levy & Kelly, 2010) that could potentially influence psychotherapy outcome, and this possibility might be further explored in future research.

Additionally, client age emerged as a significant moderator, such that the positive relation between attachment security and outcome was attenuated in samples that were older on average. This finding may be explained by cross-sectional research showing older adults are more likely to be securely attached, and less likely to be fearfully attached, than younger adults (Diehl, Elnick, Bourbeau, & Labouvie-Vief, 1998; Mickelson, Kessler, & Shaver, 1997). If this is a developmental, rather than a cohort-based, effect, then this difference suggests that some preoccupied individuals become secure (perhaps by finding or creating an intimate relationship with a trustworthy other) as they age.

Limitations of the Research

There are still relatively few empirical studies that have examined how client attachment influences psychotherapy outcome, limiting the size of our meta-analysis. In addition, there are few investigations regarding matching patients to treatments or therapists based on attachment patterns; so few, in fact, that we could not submit them to a meta-analysis.

Another limitation of our meta-analyses is that we could not control for the correlations between attachment and pretreatment functioning. The interpretation of posttreatment symptoms as outcome is potentially problematic because it does not consider baseline levels or actual change in symptoms as a function of treatment. Hence, any association between attachment and posttreatment functioning may, to some degree, reflect the relation between attachment and psychopathology. Although a number of studies that did control for the influence of pretreatment functioning on the association between attachment security and outcome have reported findings that are consistent with ours (e.g., Meyer, Pilkonis, Proietti, Heape, & Egan, 2001; Saatsi, Hardy, & Cahill, 2007; Strauss et al., 2006), the results of the current analyses should be interpreted with caution in that respect.

Summary and Therapeutic Practices

The ESs for the association of both attachment security ($r = .18$) and attachment anxiety ($r = -.22$) with treatment outcomes are in the small to moderate range, but just below those found for the association of therapeutic alliance with outcomes. Thus, in these 14 studies, clients' attachment style appears to contribute almost as much variance to psychotherapy outcome as does the alliance, a well-established predictor of therapeutic change.

However, clients' attachment security also tends to be positively associated with therapeutic alliance, with an average ES of $r = .17$ according to a recent meta-analysis (Diener, Hilsenroth, & Weinberger, 2009). Perhaps the capacity to develop a positive therapeutic alliance is enhanced by a client's level of attachment security. Conversely, the formation of a positive therapeutic alliance may serve as one mechanism by which a client's level of attachment security leads to better psychotherapy outcomes.

We derive several practice implications from the empirical research on attachment style and our meta-analysis.

- Assess the patient's attachment style. Attachment style can influence the psychotherapy process, the responses of both patients and therapists, the quality of the therapeutic alliance, and the ultimate outcome of treatment. Formal interviewing or use of reliable self-report measures can be useful as part of the assessment process.
- Understanding a patient's attachment organization will provide important clues as to how the patient is likely to respond in treatment and to the therapist. Expect longer and more difficult treatment with anxiously attached patients but quicker and more positive outcome with securely attached patients.
- Knowledge of the patient's attachment style can help the therapist anticipate how the patient may respond to the therapist's interventions and guide the therapist in calibrating to the patient's interpersonal style. That is, if the patient is dismissing in his or her attachment, then the therapist may need to be more engaged. In contrast, if the patient is preoccupied in his or her attachment, then the therapist should consider a stance designed to help the patient contain his or her emotional experience. This may include explicit articulations of the treatment frame, the provision of more structure to compensate for the patient's tendency to feel muddled, and efforts to avoid collusion with the patient who may pull the therapist to engage in more emotional/experiential techniques that only contribute to the patient feeling overwhelmed.
- At the same time, psychotherapists should not go too far in contrasting patients' attachment styles. Practice and research suggest that therapists titrate their interpersonal styles so as not to overwhelm dismissing patients or to appear disengaged, aloof, or uninterested to preoccupied patients.
- Research indicates that attachment style can be modified during treatment. Therefore, change in attachment can be conceptualized as a proximal outcome, not just a predictive patient characteristic, and could be considered a goal of treatment. Early findings suggest that the focus on the relation between the therapist and patient and/or the use of interpretations may be the mechanisms by which change in attachment organization is

achieved, at least for severely disturbed personality disordered patients (Levy et al., 2006; Høglend et al., 2009). However, the early research also demonstrates that a range of treatments may be useful for achieving changes in attachment representations in less disturbed patients with neurotic-level or Axis I disorders.

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Stability of attachment styles across students' romantic relationships, friendships and family relations

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Research on adult attachment focused mainly on the relationship with partners. However, attachment theory predicts that attachment style once formed in childhood defines the structure and quality of later relationships to significant others, which means not only partners, but also friends and family members. We were interested in finding out whether the type of relationship is a relevant variable and whether the incidence of a particular attachment style differs with regard to the type of close relationship. The aim of our study was to assess the stability of attachment styles across students' romantic relationships, friendships and family relations.

The sample consisted of 210 male and female undergraduate students of the University of Zagreb. The Experiences in Close Relationship Inventory developed by Brennan, Clark, and Shaver (1998) was administered to the participants. In order to assess the level of attachment toward other objects (friends and family members), the instrument was slightly modified. Data were analyzed and interpreted both according to their position on attachment dimensions and the type of attachment they indicate.

The results show that people form a more secure attachment in their relations with members of their families and friends than with their romantic partners. We investigated whether there is a correspondence between attachment styles in different types of close relationships. The only style that appears relatively stable is secure attachment. The non-secure attachment styles with romantic partners are highly compensated for with the secure one in other, less threatening relationships, with friends or family members. The results are discussed in relation to the age of participants and the characteristics of students' life-style.

Key words: adult attachment, various types of close relationships, attachment style

The term attachment is usually used to refer to the relationship between a mother and a child. That is, indeed, the basic example of attachment if the mother is the one who takes care of the child. But, a child can also be attached to the father, grandmother, grandfather, and later to friends, a partner and other people with whom the child may be in a long emotional relationship, regardless of its quality. Bowlby (1969) defines attachment as an affective relationship characterized by a tendency to demand and retain closeness with certain persons, especially when an individual is under stress.

Attachment is formed in infancy between a child and a person or persons taking care of the child, which, in most cases, is the mother. Depending on the mother's behavior towards the newborn, the quality of their relationship, the

mother's noticing of the child's signals and their correct interpretation, adequate responding, care and gentleness, three types of the child's attachment to the mother are formed: secure attachment, avoidant attachment, or anxious-ambivalent attachment (Ainsworth, Blehar, Waters, & Wall, 1978). If the mother notices the child's signals, interprets them correctly and responds adequately, with care and gentleness, her child will develop the secure attachment style. On the other hand, if the mother is cold and does not respond to the child's needs, the child will develop the avoidant attachment style. Finally, the mother who sometimes responds to her child's needs with warmth and care, and sometimes coldly ignores them, will probably have a child with the anxious-ambivalent attachment style.

Although the attachment theory emerged as an explanation of the emotional relationship between a child and a caregiver, Bowlby (1969) thinks that the same attachment style system exists and functions throughout the individual's lifetime. Attached behavior becomes organized within one's self as an internal working model that defines emotional relationships during one's life. Namely, a child develops an internal working model based on the mother's ade-

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quate responding to the child's needs. This internal working models shape child's expectations of other people, as well as of self. Knowing how often our expectations define our perception, cognition and behavior (e.g. self-fulfilling prophecy), it is not surprising that internal working models developed in childhood can be resistant to change and can have long-term continuity in shaping our world. Based on the attachment theory, it can be concluded that the type of attachment once adopted in childhood works and structures the quality of relationships in adolescence and adult life. Whereas in childhood parents are usually the main objects of attachment, during adolescence the hierarchy of the objects of attachment changes - young people become more oriented towards their peers. Although parents do not cease to be objects of attachment at that age nor later in life, it is believed that they are slowly becoming "objects of attachment in reserve".

Any relationship in the adult phase is a potential source of attachment. Romantic relationships will probably be the primary source of attachment, but even a relationship with close friends can be characterized as attachment. Weiss (1982) offered the criteria for attachment in the adult phase:

- the wish for closeness with the object of attachment, especially when the individual is under stress,
- the feeling of safety resulting from contact with the object of attachment,
- the uneasiness or protest when the individual faces loss or separation from the object of attachment.

The theory of attachment offers a promising theoretical framework for understanding friendship, marriage, romantic and other human relationships. Based on these ideas, several authors continued in the 1980's research in the field of adult attachment. Hazan and Shaver (1987), pioneers in the field, claimed that the same three types of attachment existing in childhood can be seen in adults. Trust in people, as well

as easiness with which they make close contacts with others are typical of *securely attached* individuals. Individuals with the *anxious/ambivalent attachment* style have an intensive need for emotional closeness with other people but they are afraid that they are not loved enough. The *avoidant attachment* individuals do not trust people and avoid being close to anyone (see Figure 1).

Bartholomew (1990), however, thinks that avoidant attachment could be the result of two different motives and, therefore, distinguishes two different forms of this attachment style. One is motivated by the defense mechanism of self-sufficiency and is called *dismissive attachment*, while the other is motivated by the fear of anticipated refusal from other individuals and it is called *fearful attachment*. Unlike Hazan and Shaver, whose starting point was Ainsworth's theory, Bartholomew starts from the Bowlby's theory framework, in which individuals internalize their experiences with caregivers, resulting in two notions which serve as the so-called *working models*: self model and model of others. These two dimensions provide the basis from which four attachment styles spring, depending on whether the individual has a positive or a negative model of oneself or others (see Figure 2).

Individuals with a positive model of self and a positive model of others, will develop the secure attachment style, which means that they will feel at ease both with intimacy as well as with autonomy. On the other hand, individuals with a positive model of self, but a negative model of others will develop the dismissive attachment style, which means that they refuse being intimate with other people and tend to be totally independent. In contrast, individuals who have a positive model of other people but a negative model of themselves have the preoccupied attachment style; they are very anxious about their relationships and afraid of being abandoned. Finally, individuals with both a negative model of self and a negative model of others have the fearful attachment style, which means that they fear intimacy and tend to avoid other people.

In their study published in 1987 Cindy Hazan and Phillip Shaver first tried to capture types of attachment in adult romantic relationships. Hazan and Shaver described the ways in which adults belonging to each of the three categories of attachment would behave in their romantic relationships, and the participants were to choose the description which described them best (see Figure 1).

Secure attachment	I find it relatively easy to get close to others and am comfortable depending on them and having them depend on me. I don't often worry about being abandoned or about someone getting too close to me.
Avoidant attachment	I am somewhat uncomfortable being close to others; I find it difficult to trust them, difficult to allow myself to depend on them. I am nervous when anyone gets too close, and often, love partners want me to be more intimate than I feel comfortable being.
Anxious/ambivalent attachment	I find that others are reluctant to get as close as I would like. I often worry that my partner doesn't really love me or won't want to stay with me. I want to merge completely with another person, and this desire sometimes scares people away.

Figure 1. Attachment measure in adulthood according to Hazan and Shaver (1987)

		Self model	
		Positive	Negative
Other model	Positive	Secure attachment	Preoccupied attachment
	Negative	Dismissive attachment	Fearful attachment

Figure 2. Two-dimensional model of attachment styles in adulthood (Bartholomew, 1990)

At least two important developments in measuring adult attachment followed: (1) several authors formed items based on descriptions of different attachment types and added level of agreement scale, analyzed factors and turned them into continuous scales; (2) Kim Bartholomew (1990) suggested the four types of adult attachment concept. She also developed the nominal (RQ) and continuous scale (RSQ) of the four attachment types, and of the two conceptual dimensions underlying those four types (Bartholomew & Shaver, 1998).

Alongside the development of these two measures, other researchers continued to develop their own instruments. Some tried to capture the two described dimensions while others tried to return to the original thesis of Bowlby and Ainsworth. In 1998, Brennan, Brennan, Clark, and Shaver published their scale, based on the unique factor analysis of all the known self-evaluation attachment scales applied to many adult respondents. The instrument is composed by combining items of 60 subscales that deal with adult attachment. Brennan found 12 specific constructive factors. Their factorization resulted in 2 second-order factors, which were clearly identified as "anxiety" and "avoidance".

Anxiety refers to the fear of rejection or abandonment whereas *avoidance* reflects the experience of discomfort caused by closeness and addiction to others. Out of a group of 323 items, the authors sorted out 18 items for each subscale, taking the items that had the highest correlation with the factors of the higher rank. According to Brennan et al. (1998), the Experience in Close Relationships Inventory is a self-evaluative scale of 36 items aimed at measuring the respondents' score on each dimension, as well as the respondents' attachment style based on the combination of results obtained on both dimensions.

Although the instrument provided by Brennan et al. (1998) is still considered one of the best attachment measures for adults (Crowell, Fraley, & Shaver, 1999), the authors suggest that continuous efforts be made in developing and improving attachment measures. One of the steps made in that direction was made by Fraley, Waller and Brennan (2000), who developed Experience in Close Relationships Inventory - Revised, a 36 item scale, possible to use online.

Research done so far on adult attachment focused mainly on the relationship with partners (Bartholomew & Horowitz, 1991; Shaver & Fraley, 1997; Fraley & Waller, 1998). However, attachment theory predicts that attachment style once formed in childhood defines the structure and quality of later relationships to significant others, which means not only partners, but also friends and family members. Therefore, in order to understand and explain adult relationships, it is of extreme importance to change the focus of research and redirect attention to other types of adult close relations.

The aim of our study was to assess the stability of attachment styles across students' romantic relationships, friend-

ships and family relations. First, we were interested in finding out whether the type of relationship is a relevant variable and whether the incidence of a particular attachment style differs with regard to the type of close relationship. According to Bowlby's predictions, this should not be the case; an individual should form the same attachment style in all his or her relations with significant others.

Therefore, the main goal of this study was to investigate whether there is a correspondence between attachment styles in different types of close relationships (with partners, friends, and with family members). Strong correlations would support the idea of attachment type consistency in various forms of close relationships. If this is not the case, if correlations are low, we would particularly be interested in finding out whether individuals compensate for inadequate relationships with partners by having more adequate relationships with their friends or family members.

METHOD

Participants

The sample consisted of 210 male and female undergraduate students of psychology and Police College from the University of Zagreb. Average age of participants was 21 years.

Instruments and procedure

The Experiences in Close Relationship Inventory developed by Brennan et al. (1998) was administered. This measure categorizes participants into four categories depending on their attachment style as defined by Bartholomew. The categorization can be made according to the respondent's scores on two dimensions: anxiety and avoidance. There are 18 items for each dimension, correlated strongly with the underlying factor. Two subscales, as well as factors they are based on, do not correlate significantly ($r = .12$, ns). Obtained Cronbach alpha internal consistency coefficients are .94 for Avoidance, and .91 for Anxiety subscale.

The participants were asked to assess how they generally feel in their relationships with romantic partners. In order to assess the level of attachment toward other objects (friends and family members), the instrument was slightly modified. The instructions for each version as well as objects of attachment in each item were changed accordingly. We also changed the order of items in the two new versions of the inventory.

The purpose of the study was explained to the participants and their informed consent was obtained before the assessment. It was made clear to all the participants that they are free to withdraw from the study in any moment without

negative consequences. None of the students refused to participate. The questionnaires were administered simultaneously and anonymously. Each participant answered all three questionnaires in random order. Although we were anxious about reactions and possible boredom due to a large number of similar questions, our participants did not object to answering all the items, and the whole procedure lasted about 20 minutes.

RESULTS

Data were analyzed and interpreted both according to their position on attachment dimensions and the type of attachment that they indicate. Before answering the research problems, we will present the main descriptive findings. We find them interesting because this is to our knowledge the first time that the quality of attachment that the same person forms in various types of close relationships was assessed and compared.

As we can see in Table 1, our participants showed a moderate level of anxiety and a slightly lower level of avoidance in their relationships. We compared the levels of the same dimension across different relations, and the results of the analysis of variance showed significant differences in the anxiety dimension ($F(2,370) = 71.901; p < .001$). For these data there is a significant linear trend ($F(1,185) = 123.231; p < .001$). The students reported the highest level of anxiety in their romantic relationships, somewhat lower in relations with their friends, and the lowest level in relations to the members of their families. Analysis of variance also yielded a significant effect of the type of relationship regarding the level of avoidance ($F(2,372) = 5.214; p < .01$). For these data a significant linear trend was found ($F(1,186) = 10.756; p < .001$). The students reported the highest level of avoidance in relations to their family members, somewhat lower in relations to their romantic partners, and the lowest level in relations to friends. If we compare levels of anxiety and of avoidance across different types of relationships, result show that students display significantly higher level of anxiety than avoidance in romantic relations ($t(195) = 7.26; p < .001$) and friendships ($t(185) = 6.79; p < .001$), while they are equally high on both of these dimensions in family relations ($t(189) = -1.46; p > .05$; see Figure 3).

Table 1

Means and standard deviations of results on anxiety and avoidance dimensions across three types of close relationships ($N = 210$)

	Anxiety		Avoidance	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Partners	66.30	17.699	52.59	18.610
Friends	60.86	15.729	49.63	15.985
Family members	53.05	14.098	55.35	18.918

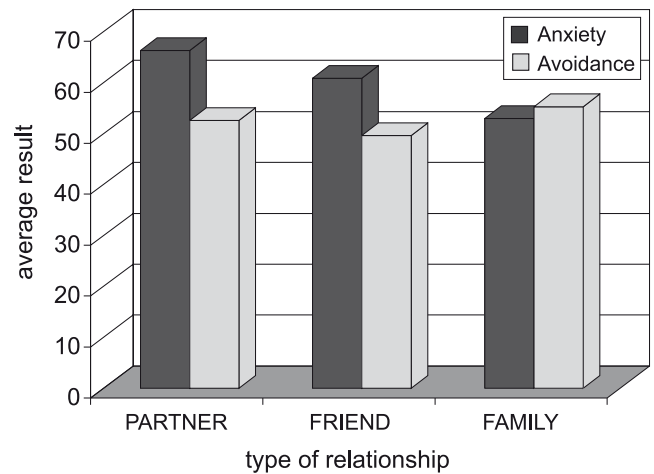


Figure 3. The level of anxiety and avoidance in attachment across different close relationships (with romantic partners, friends and family members)

Despite the widespread gender stereotype of women showing higher levels of neuroticism and anxiety (Schumaker, Barraclough, & Vagg, 1988; Warren, 1982; Twenge, 2000), no gender differences were found in the anxiety dimension of attachment. Students of both sexes reported the highest levels of anxiety in romantic relations, lower ones in friendships, and the lowest levels in family relations. There were, however, some significant gender differences in the levels of avoidance. All students reported the same levels of avoidance in romantic relations, but the male students showed significantly more avoidance in their relations with friends ($t(186) = 4.69; p < .01$) and family ($t(193) = 2.20; p < .05$) compared to the female students (see Figure 4).

Having in mind that avoidance reflects experience of discomfort caused by closeness and addiction to others, these gender differences could be the result of a need for higher autonomy and independence in our male participants, which is a well known and widely documented gender difference (Cross, Bacon, & Morris, 2000; Cross & Madson, 1997; Caldwell & Peplau, 1982; Davidson & Duberman, 1982). The young age of our participants and their limited experience with romantic partners could be the reason why gender differences were not found in attachment in romantic relationships, where women reported higher levels of avoidance than in the other two types of relations.

In order to assess the stability of attachment dimensions across different types of close relationships, Pearson's correlation coefficients were computed between the reported levels of anxiety for each relation, as well as between the reported levels of avoidance. As we can see in Table 2, our results suggest that there is a significant and relatively respectable stability in avoidance (r range from .50 to .62), but a very low stability in anxiety (r range from .25 to .30).

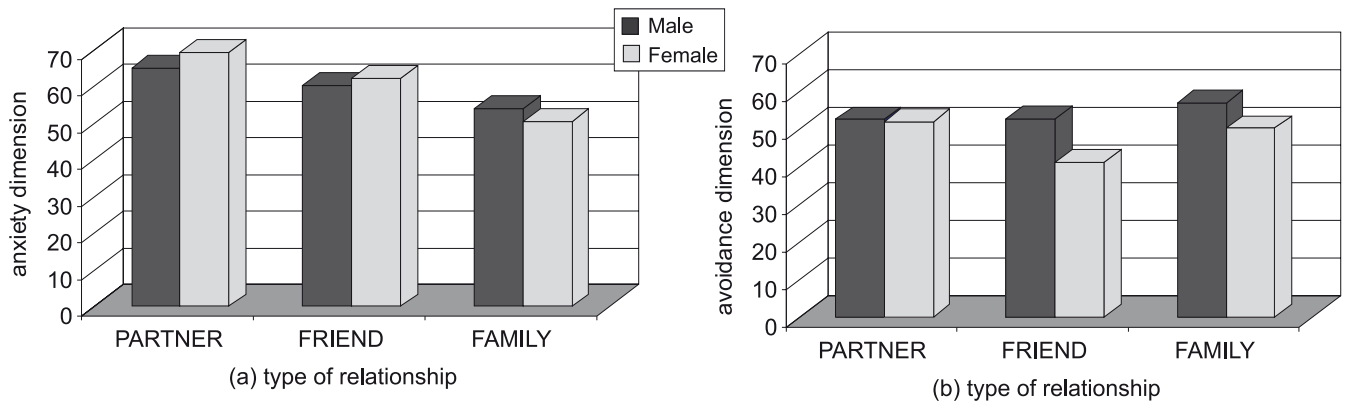


Figure 4a and 4b. Gender differences in the level of anxiety and avoidance in attachment across different close relationships (with romantic partners, friends and family members)

Table 2

Correlation coefficients between levels of anxiety and avoidance in attachment across different close relationships (with romantic partners, friends and family members)

	Partner	Friend	Family
Partner	-	.616**a	.502**a
Friend	.306**b	-	.543**a
Family	.257**b	.273**b	-

Note. a = correlation coefficients for anxiety dimension; b = correlation coefficients for avoidance dimension.

** $p < .01$.

Our analysis so far indicates that there is less stability in adult attachment across different types of close relationships than one would predict according to attachment theory, which suggests that the attachment style developed during our early years will reflect itself as some kind of inner working model on all our close relations in adulthood. However, one's result on a single attachment dimension does not equate one's attachment style, and a lower stability of avoidance dimension level does not necessarily mean that there is a low stability in the attachment style. Therefore, we continued with the data analysis in terms of the four different attachment styles formulated by Bartholomew (1990).

Data analysis in terms of four different attachment styles

According to Brennan et al. (1998), we divided our participants into four categories, each representing one of four attachment styles: secure, preoccupied, dismissive and fearful. Participants were classified into one of four groups according to the procedure suggested by Brennan et al (1998). The same procedure was performed for all three types of close relationships, and the results of these categorizations are shown in Table 3.

Table 3

Number and percentage of participants showing each of four different attachment styles in various close relationships (with romantic partners, friends and family members)

	Secure	Preoccupied	Dismissive	Fearful
Partner	96 (49%)	65 (33%)	23 (12%)	12 (6%)
Friend	130 (66%)	38 (19%)	14 (7%)	4 (2%)
Family	133 (68%)	16 (8%)	35 (18%)	6 (3%)

As we can see in the first row in Table 3, the incidence of each attachment style in romantic relationships is consistent with some other research findings (Fraley & Shaver, 2000). About half of our students have the secure attachment style, one third is preoccupied with their romantic relations, 12% are dismissive, and only 6% fearful.

We were, however, more interested in the results concerning relationships with friends and family, the area that research has not been focused on so far. These results are shown in the second and third rows in Table 3. It is obvious that there are more students (around two thirds of them) who have the secure attachment style in their relations with friends and family members, and fewer students that have inadequate attachment styles in those two types of close relationships compared to romantic relations. The only exception is the dismissive style, which is significantly more present in relations with family members (18%), even more than with romantic partners (12%) and friends (7%), which could be the reflection of the participants' age and their striving for autonomy and separation from parental influence.

These results indicate that people form a more secure attachment in their relations with members of their families and friends than with their romantic partners. This finding, however, is not surprising if we have in mind that one can usually rely on family and friends and perceive them rela-

tively stable compared to romantic partners. The results we obtained on the attachment dimensions confirm this interpretation, because the participants reported the highest levels of anxiety in romantic relationships, significantly lower ones in relations with friends, and the lowest ones with family members. But the question is whether these were the same participants that have the secure attachment style in all three types of close relationships, or different participants. In order to answer this question, we performed various data analyses. First, contingency correlations between attachment styles in different types of relations were computed (see Table 4).

Contrary to our expectations, correlation coefficients are very low and only those for the secure and preoccupied attachment styles are statistically significant (correlations range from .23 to .31; $p < .01$). There is no correlation in the dismissive and fearful attachment styles between different types of close relations. Such results suggest that students who have these attachment styles in one type of close relationships may have some different style in other relations.

To find out whether this is the case, we computed the number of matches between different types of close relations for each attachment style (see Table 5). We found out that 66 (50%) out of 133 participants having the secure attachment style in any of close relationships, have the same attachment style in all relations. This percentage is significantly lower

Table 4

Correlation coefficients between attachment styles in different types of relations (with romantic partners, friends and family members)

SECURE ATTACHMENT

	Partner	Friends	Family
Partner	1.00	.31**	.30**
Friends		1.00	.23**
Family			1.00

PREOCCUPIED ATTACHMENT

	Partner	Friends	Family
Partner	1.00	.30**	.23**
Friends		1.00	.24**
Family			1.00

DISMISSIVE ATTACHMENT

	Partner	Friends	Family
Partner	1.00	.09	.12
Friends		1.00	.03
Family			1.00

FEARFUL ATTACHMENT

	Partner	Friends	Family
Partner	1.00	-.04	-.08
Friends		1.00	-.02
Family			1.00

** $p < .01$.

Table 5

Percentage of matches between different types of close relations for each attachment style

ATTACHMENT STYLE	Maximal number of subjects	Number of matches	% of matches
Secure	133	66	50
Preoccupied	65	6	9
Dismissive	35	1	3
Fearful	12	0	0

for the other attachment styles. Only 9% of participants who have the preoccupied attachment style in one of the relationships show this style in all close relationships, 3% of those who have the dismissive attachment style, and none of those with fearful attachment style.

These results confirmed our conclusions about the stability of attachment across different types of close relationships. The only style that appears relatively stable is secure attachment, while the other styles do not. The remaining question was: If the other attachment styles are not stable across various types of relations, are these inadequate attachment styles formed in one type of relationship compensated for with the secure attachment style in other close relationships? To answer this question, we divided the participants in four categories on the basis of their attachment style in romantic relationships and counted how many participants from each category had each of the four attachment styles in the other two types of relations. The results are shown in Table 6.

As we can see from the first row in Table 6, around 80% of the participants that have the secure attachment style in their romantic relationships, have the same attachment style

Table 6

Number of participants from each category of attachment in romantic relationships who have each of four attachment styles in other two types of relations (with friends and family members)

PARTNER	FRIEND				FAMILY			
	S	P	D	F	S	P	D	F
Secure (96)	76	7	7	1	78	0	14	0
Preoccupied (65)	34	23	3	1	37	11	10	4
Dismissive (23)	14	3	3	2	14	1	7	1
Fearful (12)	6	5	0	0	3	4	4	1

Note. S, P, D, F = secure, preoccupied, dismissive and fearful attachment style. Numbers in brackets represent number of participants with particular attachment style in romantic relationship (the sum of numbers for each type of relationship does not equal the numbers in brackets due to missing cases).

in both other types of close relations. We could say that this style is relatively stable. But the others are not. Our results show that most of the people who have other attachment styles with their romantic partners do not have the same attachment style with their friends or family members. Some of them do, but more than half of them (52-57% of preoccupied, 61% of dismissive, and 50% of fearful) have the secure attachment style in the other two types of close relations. Although there are too few participants with the fearful attachment style to claim this with certainty, the pattern is obvious.

DISCUSSION

In his original attachment theory, Bowlby (1969) assumed that the attachment style a child forms with his or her mother (or caregiver) continues to exist as the inner working model that affects his or her close relationships in adulthood. For more than twenty years psychologists and psychiatrists have studied adult attachment and compared it with the attachment in infancy. But most of the studies were concerned solely with attachments in romantic relationships (Brennan et al, 1998; Fraley & Shaver, 2000; Hazan & Shaver, 1987; Kirkpatrick & Davis, 1994; Kirkpatrick & Hazan, 1994; Simpson, 1990), as if these were the only close relationships that adult people have and as if the romantic partners were the only ones that they form attachment with. This is a far cry from Bowlby's original idea!

Thus, if we follow Bowlby's predictions, we will expect to find the same type of attachment style in various types of close relations that a particular individual has in his or her life. If a certain attachment style functions as an inner working model of an individual, it has to be relatively stable during the lifetime and across different relations. In other words, a person who has developed the secure attachment style, for example, would show this style in almost every relationship she or he has, and there would be no danger that she or he will form any of the three remaining inadequate attachment styles. Unfortunately, the opposite is true as well, which means that there would be no chance for a person with the inadequate attachment style in one relationship to form the secure one in another.

However, research findings do not support this assumption completely, although they are somewhat consistent with it. Findings indicate that attachment styles are moderately stable throughout the first 20 years of life (Fraley, 1999; Baldwin & Fehr, 1995; Klohnen & Bera, 1998; Scharfe & Bartholomew, 1994). This is especially true for the secure attachment style, which in some studies proved to be the most stable (Kirkpatrick & Hazan, 1994; Crowell & Treboux, 1995).

In our study, we have found that the correlations between attachment styles of the same person in various relations are lower than expected. There were no correlations

in two styles (dismissive and fearful), and the other two correlations were barely significant. When the number of matches of the same attachment style in romantic relationships, friendships and family relations was computed, the results were astonishing. With the exception of the secure attachment style, in which 50% of matches were found, the other attachment styles proved to be highly unstable. In none of them the percentage of matches exceeded 10%. This means that there is more than a 90% chance that an individual who has the preoccupied, dismissive or fearful attachment style in one type of close relationships will have a different attachment style in other types of relation. In other words, these attachment styles are not at all stable. But, which style would the person form instead? Would it be a random choice, or is there some kind of pattern? Our results have shown that there is a pattern. The secure attachment style is the most frequent style. This is not surprising as research has so far shown that secure attachment is the most adaptive attachment style. Studies suggest that the secure attachment style in infancy is considered the most desirable style by mothers (van Ijzendoorn & Sagi, 1999). Furthermore, individuals with this attachment style report being more satisfied with their relationships and the quality of their lives (Feeney, Peterson, & Noller, 1994; Kirkpatrick & Davis, 1994; Kirkpatrick & Hazan, 1994; Simpson, 1990; Senchak & Leonard, 1992). We have found that almost 80% of individuals who have the secure attachment style with their romantic partners maintain the same style in relations with their friends and family members. And more than 50% of individuals that have each of the other three inadequate attachment styles in romantic relationships have secure attachment with either friends or family. We would dare to say that inadequate attachment styles with romantic partners are highly compensated for with the secure one in other, less threatening relationships.

However, quite the opposite interpretation is also possible. We could say that two thirds of our participants have probably developed the secure attachment style in their infancy, and they still have it in relations with the members of their families and friends. These close relationships last long enough so far and they are used to them, so they could feel secure and comfortable in them. But having in mind that our participants are students who are 21 year old on average, their romantic relationships are probably still superficial and perceived as a way of having fun. They are at the age of experimenting, enjoying their freedom, or at the age of getting to know as many interesting people as they can and trying to find their soul-mates. Most of them are not ready for commitment yet. Studies have shown that with age closeness, support and mutual care become more salient as provisions from romantic relationships (Furman & Schaffer, 2003; Shulman & Scharf, 2000; Shulman & Seiffge-Krenke, 2001). Therefore the young age of our sample could be reflected in their answers about the attachment they have in their romantic relationships. It is also possible that, because

of these characteristics, the results show inadequate attachment styles with romantic partners for the individuals that mostly have the secure attachment style with their friends and family. In other words, our results could simply be the reflection of the age of our participants.

We rely on future research to show whether this is true or not. Right now we are in the process of collecting data on more mature participants (age 30-40), who could have more experience with romantic partners. Therefore, their attachment styles reported on applied measures could be based on more accurate appraisal of their typical behavior in those relationships. This will enable us to draw more general conclusions about adult attachment.

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The effects of insecure attachment orientations and perceived social support on posttraumatic stress and depressive symptoms among civilians exposed to the 2009 Israel–Gaza war: A follow-up Cross-Lagged panel design study

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ARTICLE INFO

Article history:

Available online xxxx

Keywords:

Adult attachment
Depressive symptoms
Perceived social support
PTSD
War zone
Students
Evacuees

ABSTRACT

A follow-up Cross-Lagged-design was used to test the effects of attachment orientations and perceived social support on posttraumatic stress disorder (PTSD) and major depressive disorder symptoms (MDD) in a sample of 135 Israeli students who were evacuated from a university campus located near the Israel–Gaza border in response to increased missile-fire in the area. An internet-based data collection procedure enabled the simultaneous survey of evacuees located up to 40 km from the border at war, both during the fighting and 4 months after the ceasefire. Proximity to the border did not affect levels of PTSD or MDD symptoms, attachment orientation, or levels of perceived social support. Analyses involving Cross-Lagged Panel Correlation (CLPC) path models revealed that Attachment–Anxiety had significant positive effects on PTSD, MDD, and perceived social support. Neither PTSD nor MDD nor perceived social support had any reciprocal follow-up effect on Attachment–Anxiety. These findings underscore the central role of individual trait personality differences in predicting changes in both mental health problems and interpersonal relations over time, following exposure to trauma.

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1. Introduction

Exposure to war trauma may place civilians at risk for short- and long-term mental health problems and will most likely mobilize internal and external resources for coping with stress. For the last 8 years, civilian populations in southwestern Israel and the Gaza Strip have been exposed to ongoing military conflict between the Hamas and Islamic Jihad forces located in the Gaza Strip and Israeli military forces. Large numbers of civilians in southern Israel have been exposed to ongoing rocket and missile attacks, as well as mortar fire.

A number of recent studies have systematically examined the mental health impact of this life-threatening, ongoing exposure in Israeli populations (see Besser & Neria, 2009; Besser, Neria, & Haynes, 2009; Besser & Priel, 2010). Recently, the ongoing low-level conflict escalated into a massive military conflict, as large Israeli forces invaded the Gaza Strip and Hamas and Islamic Jihad forces in Gaza launched long-distance missiles at numerous locations deep inside Israel (Besser & Neria, in press; Neria, Besser, Kiper, & Westphal, in press). The war lasted 22 days, from December

27, 2008 through January 17, 2009. The present study focuses on this recent war.

Little is known about the longitudinal role of personality vulnerabilities in cases of exposure to war trauma. Previous research has shown that personality traits may shape individuals' perceptions of and reactions to traumatic events, and play a significant role in vulnerability to PTSD (e.g., Cox, MacPherson, Enns, & McWilliams, 2004). To expand on these findings, we used a follow-up Cross-Lagged design to evaluate the follow-up relationships between attachment orientations, perceived social support, and symptoms of posttraumatic stress disorder (PTSD) and major depressive disorder (MDD).

Attachment theory posits that early relationships with caregivers are internalized in the form of mental representations of both the self and others. These representations lead to the incorporation of internal working models, which, in turn, guide the formation of cognition, affect, and expectations in future relationships (Bowlby, 1980). Adult attachment research has focused on the roles of Attachment–Anxiety and Attachment–Avoidance (e.g., Mikulincer & Shaver, 2007) in emotional self-regulation (e.g., Mikulincer & Shaver, 2003) and in individuals' responses to situations of distress (Mikulincer, Birnbaum, Woddis, & Nachmias, 2000). Individuals scoring high on the Attachment–Anxiety dimension tend to intensify negative emotional states (*hyperactivation strategies*), whereas

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those with high scores on the Attachment–Avoidant dimension tend to distance themselves from emotional situations (*deactivation* strategies); consequently, they appear to be less sensitive to stress (see Mikulincer and Shaver (2007) for a review). The relationship between attachment style and psychopathology has received much scientific attention (see Mikulincer et al., 2000). For example, the Attachment–Anxiety dimension, in particular, has been found to predict various mental health problems, such as distress (e.g., Besser & Priel, 2006; Lopez, Mitchell, & Gormley, 2002), anxiety (e.g., Mikulincer, Florian, & Weller, 1993), depression (e.g., Besser & Priel, 2005, 2009; Wei, Mallinckrodt, Russell, & Abraham, 2004), and negative affect (e.g., Simpson, 1990). These findings offer strong empirical support for the hypothesis that insecure attachment orientations constitute a risk factor for a wide range of psychopathologies (for a review, see Mikulincer & Shaver, 2007).

Correlational findings have documented the associations between insecure attachment orientations and PTSD in a number of populations exposed to trauma (e.g., war veterans, military recruits, prisoners of war, Holocaust child survivors, and high-exposure survivors of the 9/11 terror attacks; see Mikulincer and Shaver (2007) for a review and the references therein). Recently, similar findings have also been reported for a civilian population directly exposed to prolonged terror attacks in southern Israel (see Besser et al., 2009). These findings suggest that anxiously attached individuals have increased vulnerability to negative reactions. These findings are compatible with attachment theory, but they do not necessarily reveal a causal relationship. Recently, Mikulincer, Shaver, and Horeish (2006) examined the causal role of attachment in the development of PTSD. Their study reported on Israelis' psychological reactions during the 2003 US–Iraq war, during which Israel came under missile attack, and examined the effects of attachment orientation measured *before* the war on PTSD symptoms, which were assessed daily for 21 days. Their findings indicated that attachment shapes daily responses to the trauma of war, with anxiously attached individuals exhibiting more war-related PTSD symptoms. However, no study to date has examined the role of insecure attachment orientations measured *during* a war, as well as after the ceasefire or the reciprocal effects: whether the internal models of attachment affect negative responses to the traumatic events, or whether the internal models of attachment are affected by levels of negative responses to the traumatic events.

Perceived social support is a primary interpersonal resource that has been consistently found to be associated with psychological well-being in times of stress (Norris & Kaniasty, 1996), and is considered to be a protective factor for individuals who have experienced a disaster (Norris et al., 2002) or terror attack (e.g., Hobfoll, Canetti-Nisim, & Johnson, 2006). Individuals who maintain supportive social relationships are more resilient in the face of life-threatening conditions (e.g., Norris & Kaniasty, 1996; Shalev, Tuval, Frenkiel-Fishman, Hadar, & Eth, 2006). Higher levels of perceived social support have also been linked to resilience and recovery with respect to negative responses and PTSD (e.g., King, King, Foy, Keane, & Fairbank, 1999). What remains unknown, however, is whether levels of negative responses to traumatic events are affected by levels of perceived support, or whether negative responses to traumatic events affect perceptions of social support.

In the context of adult attachment theory, empirical studies have shown that securely attached individuals deal with distress by acting constructively and turning to others for emotional and instrumental support (e.g., Mikulincer & Shaver, 2003), whereas insecurely attached adults report less available support (see Mikulincer and Shaver (2007), for a review). Accordingly, anxiously attached individuals tend to overreact to their negative feelings in order to elicit support from others and individuals scoring high on the Attachment–Avoidance dimension tend to distance themselves from others when faced with stressful events (e.g., Mikulincer & Florian, 1995; Mikulincer et al., 1993). What remains

unknown, however, is whether internal working models of attachment affect perceptions of social support, or whether the levels of security of attachment are affected by levels of perceived availability of social support.

1.1. The purpose of the present study

The goal of the present study is to extend the current knowledge by conducting a follow-up study aiming to examine the sequence of effects among attachment orientations, perceived social support, and symptoms of PTSD and MDD, by using Cross-Lagged Panel Correlation (CLPC) path analyses, so that the effects of insecure attachment orientations on symptoms and perceived social support, as well as the reciprocal effects of symptoms and perceived social support on insecure attachment orientations could be examined.

2. Method

2.1. Participants and procedures

The data for this report are derived from a large longitudinal research program designed to study the mental health effects of the 2008–2009 Israel–Gaza war among first-year, Jewish undergraduate students from Sapir College in southern Israel, which is located approximately seven km from the Israel–Gaza border (Besser & Neria, *in press*; Neria et al., *in press*). The participants were mostly females (84%) with a mean age of 23.85 ($SD = 2.15$) years. The data for the present analyses are based on two waves of data collection: Time-1 of the survey was conducted on January 7, 2009, at war, and a follow-up survey conducted on May 8, 2009, 4 months after ceasefire (Time-2). Due to the emergency conditions in the region in which Sapir College is located, students were asked to evacuate the college at the beginning of the war. Despite this evacuation, the data suggest that most students remained within the range of the long-distance missiles (up to 40 km from the border, as defined by the Israeli Home Front Command). Forty-seven participants (34.8%) relocated to towns and villages up to 20 km from the border, 40 participants (29.6%) relocated to areas between 20 and 30 km from the border, and 48 participants (35.6%) relocated to areas between 30 and 40 km from the border.

We administered the study via the “e-learn” web system of the college, enabling quick and simultaneous data collection. The data collection process lasted no more than 24 h at each time point regardless of the location of the participant. In order to recruit the sample, we initially sent personal e-mail invitations to all students enrolled in an introductory psychology class at the college ($n = 200$; 170 females and 30 males). To facilitate participation in all stages of the study, as well as quick responses to the invitations, participants were asked whether they would agree to take part in both waves of the study and, if so, to send back an electronic consent form within 48 h of the invitation and submit the completed surveys within 24 h of receiving them. One hundred and fifty students (75%) were interested enough to review the consent form and the survey. Of these students, 135 (90%; 113 females and 22 males) consented and submitted the survey at Time-1, and 133 (112 females and 21 males) of the participants at Time-1 submitted the survey at Time-2.

2.2. Measures

2.2.1. Adult attachment insecurities

Participants' self-reported attachment scores on the anxiety and avoidance dimensions were evaluated using the Experiences in

Close Relationships – Revised scale (ECR-R; Fraley, Waller, & Brennan, 2000). ECR-R scores are computed into two dimensions, Avoidance (or *discomfort with closeness and discomfort depending on others*) and Anxiety (or *fear of rejection and abandonment*). [See Fraley et al. (2000) for more information on the reliability and validity of this instrument and its scoring.] In the present study, we obtained internal consistency reliability coefficients of Cronbach's $\alpha = 0.88, 0.81, 0.86$, and 0.82 for Attachment–Anxiety and Attachment–Avoidance, for Time-1 and 2, respectively.

Perceived social support. The Multidimensional Scale of Perceived social support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) was used to assess perceived social support. The MSPSS is a 12-item questionnaire containing three subscales, each consisting of four items, which measure perceived availability of social support from friends, family, and a significant other. Items are scored on a 7-point Likert-type scale, ranging from 1 (*very strongly disagree*) to 7 (*very strongly agree*) for each item. For this study, we calculated an overall MSPSS score for each participant. [See Cauty-Mitchell & Zimet (2000) for more information on psychometric properties.] This scale has been found to demonstrate high internal consistency in previous studies (e.g., Besser & Priel, 2010). In the present study, we obtained internal consistency reliability coefficients of Cronbach's $\alpha = 0.91$ and 0.93 at Time-1 and 2, respectively.

2.2.2. Post traumatic stress disorder (PTSD) symptoms

PTSD was measured using the Hebrew version of the PTSD Inventory (Solomon et al., 1993), which includes 17 items, to which participants respond using a 4-point scale (1 = *not at all* to 4 = *extremely*). Respondents were asked to rate the extent to which they had been bothered by each symptom in the past month in relation to the Israel–Gaza war, allowing determination of prevalence of PTSD and assessment of symptom severity. The average score across all symptoms served as the overall PTSD symptom severity score. This scale demonstrated high internal consistency in previous studies (e.g., Solomon et al., 1993), as well as high convergent validity when compared with diagnoses based on structured clinical interviews (e.g., SCID; Solomon et al., 1993). In the present study, we obtained internal consistency reliability coefficients of Cronbach's $\alpha = 0.87$ and 0.85 for Time-1 at Time-2, respectively.

2.2.3. Major depressive disorder (MDD) symptoms

The survey forms included the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), to assess current symptoms of DSM-IV major depressive disorder (MDD). This questionnaire is comprised of nine items that directly relate to each of the nine symptoms of depression, as defined by the DSM-IV. Each of these items is scored from 0 to 3, resulting in a maximum total score of 27, with higher scores representing more severe depression. In the present study, we obtained internal consistency reliability coefficients of Cronbach's $\alpha = 0.88$ and 0.93 for Time-1 and 2, respectively.

All questionnaires were administered in Hebrew [The original English versions of the MSPSS and of the MDD were previously translated into Hebrew using the back-translation (Besser & Neria, in press; Neria et al., in press; and Besser & Priel, 2010)]. Potential order effects were controlled by means of a randomized presentation of the questionnaires within and between participants and time of measurement.

3. Results

3.1. Symptom levels of PTSD and MDD

In order to test whether the levels of mental health problems have significantly declined over time when mean symptoms of

each outcome (contingence scores) were calculated, we conducted *t* tests with within-subject dependent repeated measures. The results indicated a significant large decrease in levels of PTSD ($p < 0.001$), a medium decrease in levels MDD ($p < 0.001$) and a significant medium increase in levels of perceived social support ($p < 0.001$). Levels of Anxiety and Avoidance insecure attachment orientations remained relatively stable. Although the decrease in Attachment–Anxiety is found to be significant ($p < 0.05$) it should be regarded as a less than small decrease in terms of its effect size (Cohen's $d < 0.20$). *M* and *SD* values for PTSD, MDD and perceived social support at each time point and *t* and Cohen's *d* values are presented in Table 1.

3.2. The associations between PTSD and MDD, and proximity to the war zone

ANOVAs were used to examine whether the proximity of the participants to the war zone (i.e., the distance from the Israel–Gaza border after evacuation as defined by the Israeli Home Front Command: areas up to 20 km, areas between 20 and 30 km, and areas between 30 and 40 km from the border) is associated with their levels of mental health problems (PTSD and MDD) at each time point. Our findings indicated no significant associations between proximity to the border and levels of symptoms at Time-1 or Time-2 ($F_s < 1.0$ ns). Furthermore, analyses of the associations between proximity to the border and the remaining study variables indicated no significant associations with any of the other study variables ($F_s < 1.0$ ns).

3.3. Insecure attachment orientations, perceived social support, and PTSD and MDD symptoms

Table 2 shows the zero-order correlations between the continuous study variables. As shown in this table, Attachment–Anxiety at Time-1 was significantly associated with low perceived social support and high levels of both PTSD and MDD at both Time-1 and Time-2. Attachment–Avoidance, however, was not significantly associated with any of the study variables at any time point. Perceived social support was significantly associated with low levels of PTSD and MDD at both times. The levels of Attachment–Anxiety, Attachment–Avoidance, PTSD, MDD, and perceived social support at Time-1 were each significantly associated with their respective levels at Time-2. Since Attachment–Anxiety, but not Attachment–Avoidance was found to be a potential significant predictor, Attachment–Avoidance was excluded from subsequent analyses.

Table 1

Means and standard deviations of PTSD, MDD, Insecure attachment orientations, and perceived social support among civilians exposed to the 2008–2009 Israel–Gaza war at war and 4 months after ceasefire.

	At war (7 January 2009)		4 months after ceasefire (10 May 2009)		<i>t</i>	Effect size <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
PTSD	2.07	0.63	1.63	0.53	10.09***	0.88
MDD	9.33	5.57	6.15	4.44	6.72***	0.60
AnxAtt	3.37	1.06	3.24	1.14	2.01*	0.17
AvoidAtt	2.81	0.75	2.88	0.81	–1.23 ns	0.11
Perceived social support	67.95	16.48	73.93	10.72	–4.59***	0.42

Note: AnxAtt = Attachment–Anxiety. AvoidAtt = Attachment–Avoidance.

* $p < 0.5$.

*** $p < 0.001$ (two-tailed).

Table 2

Correlations among insecure attachment orientations, perceived social support, PTSD and MDD symptoms among civilians exposed to the 2008–2009 Israel–Gaza war at war and 4 months after ceasefire.

Variable	1	2	3	4	5	6	7	8	9
<i>At war (7 January 2009)</i>									
1. AnxAtt	–								
2. AvoidAtt	0.22	–							
3. Perceived social support	–0.34***	–0.10	–						
4. PTSD symptoms	0.36***	–0.04	–0.62***	–					
5. MDD symptoms	0.36***	0.08	–0.35***	0.72***	–				
<i>4 months after ceasefire (10 May 2009)</i>									
6. AnxAtt	0.76***	0.07	–0.27***	0.36***	0.25**	–			
7. AvoidAtt	0.13	0.64***	–0.03	–0.07	–0.04	0.20	–		
8. Perceived social support	–0.40***	–0.11	0.46***	–0.26***	–0.15	–0.37***	–0.14	–	
9. PTSD symptoms	0.41***	0.04	–0.42***	0.63***	0.57***	0.49***	0.00	–0.20	–
10. MDD symptoms	0.35***	0.10	–0.27**	0.39***	0.43***	0.44***	0.12	–0.30***	0.68***

Note: AnxAtt = Attachment–Anxiety; AvoidAtt = Attachment–Avoidance. To ensure that the overall chance of a type I error remained <0.05, a full Bonferroni correction was implied.

** $p < 0.01$.

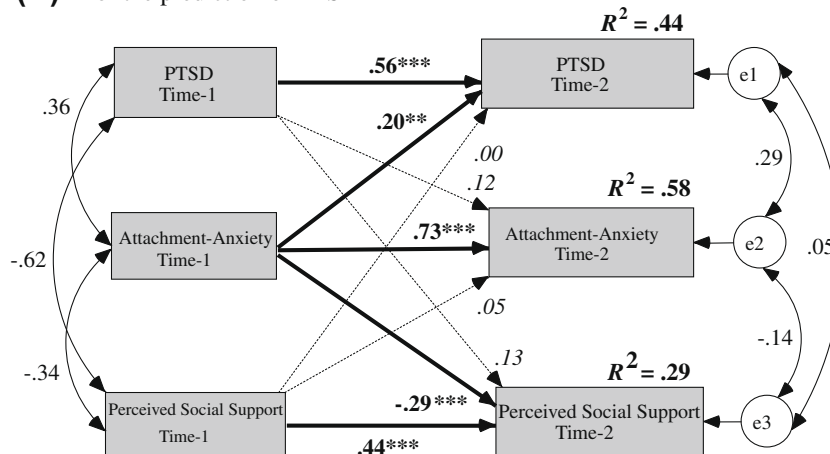
*** $p < 0.001$ (two-tailed).

3.4. Cross-Lagged path models: Attachment–Anxiety predicts PTSD, depression, and perceived social support

We used Cross-Lagged Panel Correlation (CLPC) path models to explore the causal sequence between Attachment–Anxiety and

Perceived social support at Time-1 and symptomatology at Time-2 (PTSD or MDD). Path models were constructed using AMOS software based on the variance-covariance matrix (Version 4.01; Arbuckle, 1999), we tested the fit of these models using maximum-likelihood estimations.

(A) For the prediction of PTSD



(B) For the prediction of MDD

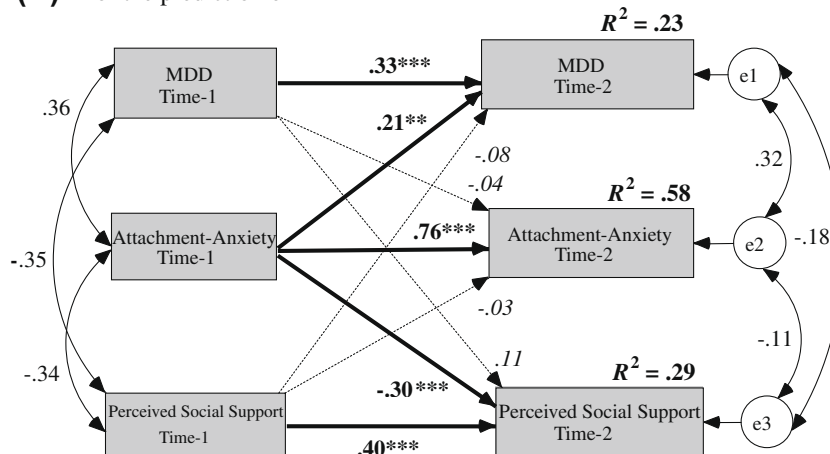


Fig. 1. The Cross-Lagged models. (A) For the prediction of PTSD. (B) For the prediction of MDD. Note: Rectangles indicate measured variables. Small circles reflect residuals (e); bold numbers above or near endogenous variables represent the amount of variance explained (R^2). Unidirectional arrows depict hypothesized directional or “causal” links/associations. Standardized maximum-likelihood parameters are used. Bold estimates are statistically significant at ** $p < 0.01$ and *** $p < 0.001$. The dotted paths indicate nonsignificant, “causal” links/associations.

We first examined the full models (see Fig. 1A and B for the models predicting PTSD and MDD, respectively). Several components of these models are noteworthy. First, they include two time points and the effects of insecure Attachment–Anxiety and perceived social support on PTSD or MDD are estimated. These aspects of the models are referred to as Cross-Lagged effects. Second, the model also includes the influence of Attachment–Anxiety at the first time point on Attachment–Anxiety at the later time point. The same is true for perceived social support, PTSD, and MDD. These aspects of the model, called autoregressive effects, can be thought of as indicators of the temporal stability of the measures. Estimations of these parameters in the model control for the stability of the variables. Thus, any Cross-Lagged effects can be considered effects that add predictive power over and above that which can be simply obtained from the stability of the measures. Finally, note that Attachment–Anxiety, perceived social support, PTSD, and MDD are each allowed to intercorrelate within each time point, represented by the curved, double-headed arrows. These aspects of the model called synchronous correlations. Estimating these errors in the model allows for correlations between variances in PTSD or MDD and Attachment–Anxiety and perceived social support that are not already explained by the influences of the variables from earlier time points (see Fig. 1). To ensure that perceived social support, PTSD and MDD symptom scores, within each time point, do not convey essentially the same information, multicollinearity diagnostic analyses were performed. Eigenvalues of the scaled and uncentered cross-products matrix, condition indices, and variance-decomposition proportions, along with variance inflation factors (VIF) and tolerances from multicollinearity diagnostic analyses indicated the absence of multicollinearity. Thus, the measures of perceived social support and of PTSD and MDD symptoms were not redundant.

The full models showed a nonsignificant effect of Time-1 Symptoms on Time-2 Attachment–Anxiety ($\beta = 0.12$, $t = 1.62$, ns and $\beta = -0.04$, $t = -0.65$, ns for the prediction of PTSD and MDD, respectively) and perceived social support ($\beta = 0.13$, $t = 1.31$, ns and $\beta = 0.11$, $t = 1.28$, ns for the prediction of PTSD and MDD, respectively), as well as nonsignificant effects of Time-1 perceived social support on Time-2 Attachment–Anxiety ($\beta = 0.05$, $t = 0.74$, ns and $\beta = -0.03$, $t = -0.43$, ns for the prediction of PTSD and MDD, respectively) and symptoms ($\beta = 0.00$, $t = 0.03$ ns and $\beta = -0.08$, $t = -0.91$, ns for the prediction of PTSD and MDD, respectively). In contrast, Time-1 Attachment–Anxiety had a noteworthy and statistically significant follow-up effect on both symptoms and perceived social support, such that higher levels of Attachment–Anxiety at one time point were related to an increased level of symptoms ($\beta = 0.20$, $t = 2.90$, $p < 0.004$ and $\beta = 0.21$, $t = 2.46$, $p < 0.01$ for the prediction of PTSD and MDD, respectively) and a decreased level of perceived social support ($\beta = -0.29$, $t = -3.68$, $p < 0.0001$ and $\beta = -0.30$, $t = -3.71$, $p < 0.0001$ for the prediction of PTSD and MDD, respectively) at the subsequent time point, as evidenced by the statistically significant Cross-Lagged parameters. However, these models had zero degrees of freedom, so fit could not be estimated.

To obtain the most parsimonious model and allow the evaluation of the overall goodness-of-fit of the path models, we calculated final models in which we removed the nonsignificant paths found in the full models. In these final models, we delineated the effect of symptoms at Time-1 on symptoms at Time-2, the effect of Attachment–Anxiety at Time-1 on Attachment–Anxiety at Time-2, and the effect of perceived social support at Time-1 on perceived social support at Time-2, as well as the effects of Attachment–Anxiety on symptoms and perceived social support at Time-2, while controlling for the predictors' associations and outcome error terms. These models had acceptable indices of fit:

$[\chi^2(4) = 5.1$, $p = 0.28$, $\chi^2/df = 1.28$, $NNFI = 1.0$, $CFI = 1.0$, $RMSEA = 0.04$ (C.I. 0.000–0.05)] for the prediction of PTSD (see Fig. 1A) and $[\chi^2(4) = 2.53$, $p = 0.64$, $\chi^2/df = 0.63$, $NNFI = 1.0$, $CFI = 1.0$, $RMSEA = 0.000$ (C.I. 0.000–0.09)] for the prediction of MDD (see Fig. 1B). These findings indicate with considerable certainty that Attachment–Anxiety at war (at Time-1) predicted or affected participants' symptomatology and perceived levels of support at Time-2 (4 months after ceasefire), and that participants' symptomatology or perceived levels of support at Time-1 did not predict or affect levels of Attachment–Anxiety at Time-2.

4. Discussion

The goal of the present study was to examine the relationships between insecure attachment orientations, perceived social support, PTSD, and MDD via a follow-up study. The study was conducted in a sample of Israeli students who were forced to evacuate a college campus in southern Israel due to an armed conflict between Israel and the Hamas regime in the Gaza Strip (December 27, 2008 through January 17, 2009).

Our data suggest that proximity to the border was not associated with symptoms or any other study variables. Thus, regardless of the objective threat (i.e., the amount of time one had to take cover between the moment the air raid siren sounded and the moment the incoming rocket or missile hit, which was a function of one's distance from the Israel–Gaza border), our findings suggest that the evacuation did not yield improved psychological symptoms among evacuees who continued to be exposed to missile attacks. The elevated prevalence PTSD and MDD at Time-1 can be explained by the powerful threat to life that participants experienced during the war. It is noteworthy that many participants in this sample may have continued to be exposed to long-distance missiles (up to 40 km from the Gaza–Israel border) even after evacuation. Nevertheless, our findings indicate a significant and sharp decrease in mean levels of PTSD and MDD symptoms at 4 months after ceasefire, as well as significant increases in the perceived availability of social support and decrease in reported levels of Attachment–Anxiety. Consistent with previous studies in civilians exposed to terrorism (e.g., Galea et al., 2003), these findings suggest an overall resilience and an impressive ability to bounce back over time among the participants in this study.

The present study demonstrates the vulnerability of individuals scoring high for the attachment anxiety orientation, as compared to those scoring high for the avoidance orientation. This finding is consistent with previous studies that have consistently documented the link between attachment anxiety orientation and psychological distress (Mallinckrodt & Wei, 2005; Wei, Heppner, & Mallinckrodt, 2003; Wei, Russell, Mallinckrodt, & Zakalik, 2004), PTSD (Declercq & Willemssen, 2006; Zakin, Solomon, & Neria, 2003), life stress (Neria et al., 2001), as well as with findings from a study documenting the association between attachment avoidance regulation strategy and decreased sensitivity to stress (Lopez & Brennan, 2000). Individuals with different attachment orientations seem to differ in the strategies they use to deal with stress, as well as in their associated symptomatology. Those scoring high for the attachment anxiety orientation may be hypervigilant to sources of distress and hypersensitive to the problems they experience; whereas individuals scoring high for the avoidance attachment orientation seem to divert negative emotions from awareness (Kobak & Sceery, 1988; Mikulincer, Florian, & Tolmatz, 1990).

Consistent with previous studies, these results show that anxiously attached individuals with low levels of perceived social support are more likely to exhibit increased levels of symptomatology when exposed to traumatic events. Indeed, findings of previous

correlational studies, as well as this study's findings for Time-1, point to the potential coexistence of attachment effects on reactions to ongoing exposure to trauma, as well as to the possible effects of adults' exposure to ongoing threats on their internal working models of attachment (Besser et al., 2009). However, importantly, the current study's follow-up findings indicate Cross-Lagged effects in which Attachment–Anxiety had a significant effect over time on both levels of symptoms and perceptions of social support, such that higher levels of Attachment–Anxiety at the time of exposure (at war) were related to increased levels of symptoms and decreased levels of perceived social support 4 months later.

Importantly, no reciprocal effects were found. In other words, although higher levels of Attachment–Anxiety predicted increased levels of PTSD and MDD symptoms and decreased levels of perceived social support 4 months after ceasefire, PTSD, MDD, and perceived social support did not have any effects on Attachment–Anxiety over time.

These findings are interesting for a number of reasons. First, they provide further evidence for Attachment–Anxiety as a vulnerability factor, given that it was found to increase the severity of PTSD and MDD symptoms and reduce levels of perceived support 4 months after ceasefire. Thus, although our findings indicate an overall resilience in the sample, with an increase in perceived social support and a decrease in symptoms over time, individuals with high levels of Attachment–Anxiety have remained vulnerable and, therefore, exhibited high levels of PTSD and MDD symptoms. Moreover, these individuals have perceived their social networks as being less supportive under situations of continuous stress and have maintained these views over time. It is possible that anxiously attached individuals tend to overreact to their negative feelings in order to elicit support from other individuals (Mikulincer & Florian, 1995). Future research should investigate whether highly anxiously attached individuals facing extreme traumatic stress may become overly needy and overtax significant others. The results of the analysis conducted using the Cross-Lagged models further support the relative stability of individual differences in personality vulnerability factors and their moderately strong predictive effects on both positive and negative outcomes in trauma-exposed individuals.

The present study has several limitations. First, the study utilized a selected sample of college students, with underrepresented proportion of men and therefore does not necessarily represent the general population. Second, our sample was small and relatively homogeneous in terms of demographics and trauma exposure. Third, due to the unique circumstances under which it was conducted, this study did not include a control group of evacuated students located outside the range of the missile-fire. Despite these limitations, our study investigated a unique phenomenon, focusing on real-time major stressful events that may well have significant ecological validity. The study focused on participants who reported on their experiences as they were occurring, under “in vivo” life-threatening conditions, and 4 months later. Moreover, to our knowledge, the present study represents the first attempt toward efforts to further understand the relationships between civilians' insecure attachment orientations, perceived social support, PTSD, and MDD, over time, through the use of a Cross-Lagged design. An important next step will be to use longitudinal designs to explore the underlying mechanisms of trauma related emotional problems. For example, one possible direction would be to examine the longitudinal role of various affect regulation strategies as potential mediators and/or moderators of the obtained Cross-Lagged effects. Taken as a whole, the present study pointed to the central role of individual differences in personality vulnerability factors in mental health problems and interpersonal relations in response to war trauma exposure.

Acknowledgments

Grateful thanks are extended to all of the participants in this study. We would like to thank the anonymous reviewers for their constructive suggestions and comments on an earlier draft of the paper.

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Looking Outside and Inside: Self-Concept Development of Gifted Adolescents

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ABSTRACT: *The internal/external frame of reference model (Marsh, 1986) was proposed to explain the development of academic self-concepts for general ability samples. Recent research calls into question the model's applicability for gifted adolescents' academic self-concept development. This model was examined for 131 adolescents participating in a summer program for academically talented students. Results suggest that the model is useful in understanding the academic self-concept development of students who are gifted, with no significant differences among students with demonstrable strengths in mathematics, verbal areas, or both areas. Educators should be aware that exceptional performance in one area, such as mathematics, will probably have a positive impact in mathematics self-concept but a negative impact on other academic self-concepts, such as verbal self-concept.*

Researchers and practitioners working with children are becoming increasingly aware of the role of affective processes in students' intellectual development. For example, investigators have examined the significance of positive attachments, anxiety and task performance, and classroom and family climate for healthy adolescent development (Cotterell, 1992; Henry, Moffitt, Silva, & McGee, 1991; Nelson, 1984). This accent on affect has also become increasingly prevalent within the fields of gifted education and talent development. Recent investigations have explored psychological adjustment, the psycholog-

ical and behavioral consequences of lack of challenge in school, depression and self-esteem, and stress and coping (Brody & Benbow, 1986; Gallagher, Harradine, & Coleman, 1997; Luthar, Zigler, & Goldstein, 1992; Plucker, 1998; Plucker & McIntire, 1996). The need for considering affective issues related to the development of youth who are gifted is apparent in the growth of groups and organizations devoted to this cause (e.g., the Social and Emotional Needs of the Gifted organization), as well as current educational and counseling efforts (e.g., Nail & Evans, 1997; Reis, 1995).

Researchers have called for more systematic work in this area with appropriate instru-

mentation (Cornell, 1994; Hoge & Renzulli, 1993). For example, models of self-concept development among students who are gifted are rarely examined, with a majority of self-concept work focusing on measurement and validity studies. In order to better understand the intellectual and affective growth of gifted students, researchers need to create and evaluate models of self-concept development that incorporate the role of affective variables in academic and intellectual development.

SELF-CONCEPT AND ADOLESCENT WELL-BEING

Among the affective constructs that have been targeted as important to adolescent well-being, few have received greater attention than self-concept. Self-concept is, at the most simplistic level, an idea or set of ideas one has about oneself. During adolescence, the self-concept becomes more abstract and differentiated, enabling complex forms of self-representation to take shape (Erikson, 1968; Harter, 1986). Current theorists (e.g., Byrne & Shavelson, 1996; Harter, 1982; Marsh & Shavelson, 1985) suggest that an individual has distinct views of self within various areas, including general self-concept (e.g., self-worth, self-esteem, global self-concept) and more specific social/relational and scholastic/academic self-concepts. Academic self-concept is important for understanding a variety of school-related constructs, including educational and occupational aspirations (Marsh, 1991) and school achievement (Hoge & Renzulli, 1993).

Models of self-concept are generally considered to be either unidimensional or multidimensional in nature, with additional classifications within each major category (Byrne, 1996; Strein, 1993). Researchers in the multidimensional tradition have differentiated general "academic self-concept" into mathematics and verbal self-concepts along with a general "school" category (Byrne & Worth Gavin, 1996; Marsh & Yeung, 1988). These components are often arranged in a hierarchical fashion, with general self-concept at the apex of the model. Math and verbal self-concepts have been linked

to achievement in school and on relevant tests; students who feel better about their math or verbal ability tend to demonstrate higher achievement in the corresponding subject area (Marsh, Parker, & Barnes, 1985; Marsh & Yeung, 1998).

GIFTED ADOLESCENTS' SELF-CONCEPT

The academic self-concept of children who are gifted has been addressed in a variety of ways and toward a number of different ends (Dixon, 1998), usually using the *general* academic/scholastic self-concept rather than the *subject-specific* constructs. Students who are gifted tend to have positive general academic and social self-concepts, higher than those of nongifted comparison groups (see Hoge & Renzulli, 1993; Janos & Robinson, 1985; Ross & Parker, 1980). General academic self-concept has been positively linked to achievement for gifted students (Kelly & Jordan, 1990; Van Bortel & Monks, 1992) and classroom peer status for adolescent girls who are gifted in a summer enrichment program (Cooley, Cornell, & Lee, 1991; Cornell et al., 1990). Furthermore, academic self-concept may shed light on negative academic outcomes like the underachievement of gifted children (Ross & Parker, 1980).

Fewer investigators have examined the specific math and verbal self-concepts of students who are gifted. Such work indicates that gifted students tend to have more positive feelings about their competence in math and verbal domains than nongifted students (Brounstein, Holahan, & Dreyden, 1991; Norman, Ramsay, Martray, & Roberts, 1999; Pajares & Graham, 1999). However, the association of achievement in an academic area and related self-concept

Students who feel better about their math or verbal ability tend to demonstrate higher achievement in the corresponding subject area.

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does not appear to be clear cut (Hoge & Renzulli, 1993). For example, a student with strong mathematical and verbal achievement will not necessarily have high mathematics and verbal self-concepts. Since no models exist for explaining the relationship between gifted students' achievement and academic self-concept, further investigation of subject-specific self-concepts of students who are gifted is warranted (Williams & Montgomery, 1995).

DEVELOPMENT OF ACADEMIC SELF-CONCEPT

Given the significance of the academic self-concept, the enhancement of self-concept outcomes is of concern to educators, practitioners, and program developers. Before systematic attempts can be made to create environments or programs that foster positive academic self-concept, careful analysis of developmental theories of self-concept must be undertaken. Marsh and colleagues (Marsh, 1986; Marsh et al., 1988) proposed the internal/external frame of reference model (I/E model) to delineate processes that result in the formation of self-concepts in particular academic domains (Figure 1; see Bong, 1998, Williams & Montgomery, 1995, and Skaalvik & Rankin, 1990, 1992, for other treatments of this model).

According to this model, students base their self-concept on two simultaneous comparison processes. The *internal* comparison (or "frame of reference") includes an individual student's appraisal of her ability in one academic domain (e.g., math) in comparison to her ability in other academic areas. The *external* comparison is the student's evaluation of competence in that academic domain relative to the perceived ability of peers. This social comparison reflects the notion that peer groups provide important

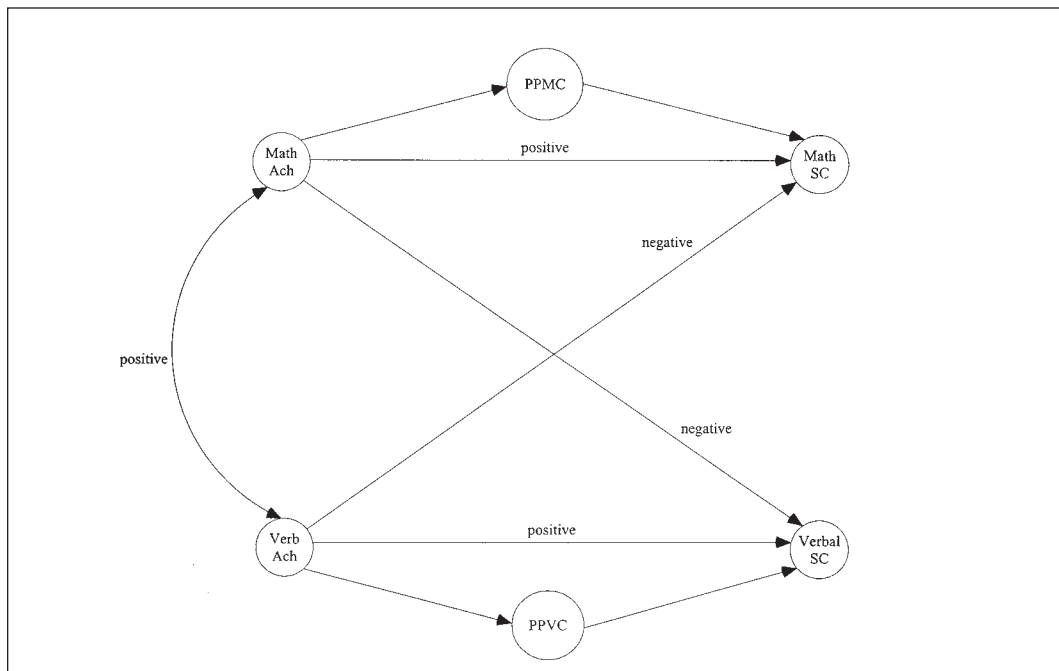
information about relative standing in a given domain (e.g., Festinger, 1954; Marsh, 1984; Marsh & Parker, 1984; Marsh, Smith, & Barnes, 1985; Marsh, Chessor, Craven, & Roche, 1995; Renick & Harter, 1989; Skaalvik & Rankin, 1990). Therefore, a student's self-concept in mathematics is derived from her perceived math competence relative to competence in other subjects as well as from an evaluation of math competence relative to that of her peers.

The I/E model hypothesizes that achievement in one area has a direct positive effect on similar-domain self-concept (due to the external comparisons) and a negative effect on the self-concept in the other domain (due to the internal comparisons). For example, a student's verbal achievement would have a strong positive impact on her verbal self-concept and a moderate negative impact on her math self-concept; a student with high verbal performance is expected to feel good about herself in terms of verbal ability but less positive about herself in terms of math. In essence, the effects of the external and internal comparisons largely cancel each other out. As a result, a student's math self-concept development may appear to be unrelated to her verbal self-concept, although she may have very similar mathematics and verbal achievement.

Some aspects of frame of reference models have been examined for students who are gifted. For example, a number of investigators have discussed the negative effect of comparison processes on the academic self-concept of students participating in gifted programs. Because intense, highly challenging coursework and close exposure to similarly talented peers are hallmarks of programs designed to serve gifted populations (Olszewski-Kubilius, 1997; Stocking, 1998), students who are gifted frequently suffer a decrease in their perceived academic competence when first enrolled in such programs (Marsh et al., 1995; Olszewski, Kulieke, & Willis, 1987; Richardson & Benbow, 1990; Swiatek & Benbow, 1991); they feel less positive about their academic ability when they realize there are so many *other* bright young people. Furthermore, Skaalvik and Rankin (1992) evaluated the I/E model and found that this model worked well *except* for students who perceived

FIGURE 1

Internal/External Frame of Reference Model Proposed by Marsh (1986).



Note: Math Ach = Mathematics Achievement; Verbal Ach = Verbal Achievement; Math SC = Math Self-concept; Verbal SC = Verbal self-concept; Math Ach—Math SC and Verbal Ach—Verbal SC paths represent external comparisons, while Verbal Ach—Math SC and Math Ach—Verbal SC paths represent internal comparisons.

their math and verbal achievement to be similar, which may be the case for students who may manifest high performance in a number of academic pursuits.

Williams and Montgomery (1995) used the I/E model to examine the academic self-concepts of 103 high school honors students enrolled in an honors science program. While in their science classes, participants completed an instrument adapted from the ME: Self-Concept Scale for Gifted Children (Feldhusen & Kolloff, 1981) to measure math and language self-concept; students' prior Iowa Test of Basic Skills (ITBS) scores served to indicate subject-specific achievement. The model was not disconfirmed by the findings; math and verbal achievement were strongly related, while math and verbal self-concepts were not related. Furthermore, subject-specific achievement had the predicted strong positive effect on the corresponding self-concept domain (evidence for an external frame of reference) and a weaker negative effect on the other self-concept domain (support for an inter-

nal frame of reference). The investigators concluded that academically able students used both internal and external comparisons in determining their math and verbal self-concepts.

In summary, some evidence has been garnered that the I/E model is appropriate for the development of gifted students' math and verbal self-concepts. However, a number of questions remain unanswered. For example, Williams and Montgomery (1995) studied honors students participating in science classes; how would this model work for students identified as gifted under more stringent, standardized criteria? Would this model be equally appropriate for students highly talented in a specific domain (i.e., math or verbal) as it would those talented in several content areas? Would this model adequately describe the development of math and verbal self-concepts for gifted students participating in challenging, extracurricular academic programs, given the literature on academic self-concept in such programs? This article addresses these questions.

METHOD

PARTICIPANTS

Study participants included 131 (43% female, 57% male) rising 8th to 10th grade students enrolled in a summer residential program, an intensive 3-week academic experience, during the summer of 1995. Seventh grade students in the program's region of the country scoring at or above the 97th percentile on their school-administered achievement test were invited to participate in the Talent Search, which ensures 4 years of informational and motivational resources, as well as an invitation to take the SAT or ACT out-of-level. The talent search method has historically provided a useful, efficient means of identifying students of very high ability in one or more scholastic domains (Lupkowski-Shoplik & Swiatek, 1999; Olszewski-Kubilius, 1998). Students become eligible for the summer residential programs by achieving specific SAT (or ACT) score criteria; for example, 7th grade students testing in 1995 needed to achieve 550 or higher on the math portion of the SAT to gain entrance into an algebra class. Students in the sample ranged from 12 to 16 years of age, with an average age of 14.0. Approximately 73% of the students were Caucasian, 14% Asian American, 5% African American, 5% Hispanic, and 3% reported their ethnicity as "other" or chose not to provide demographic information.

INSTRUMENTATION

Participants completed the *Self-Description Questionnaire II* (SDQII; Marsh, 1992), a widely-used measure of adolescent self-concept (Byrne, 1996). The SDQII includes 102 items indicating levels of self-concept in 11 dimensions; this study employs only scores representing math self-concept (e.g., "Mathematics is one of my best subjects") and verbal self concept (e.g., "Work in English classes is easy for me"). Item responses are on a 6-point Likert-type scale (1 = false to 6 = true); half the items are reverse-coded. Plucker, Taylor, Callahan, & Tomchin (1997) found sufficient evidence of reliability and validity for gifted adolescents' SDQII scale scores for use in group research settings. Math and verbal achievement were indicated by scores obtained on the SAT taken out-of-level no more

than 2 years prior to completion of the SDQII, as is standard for Talent Search-based programs (Olszewski-Kubilius, 1998).

ANALYSIS

Basic model. Marsh's (1986) internal/external frame of reference model was fit to students' math and verbal SAT scores and math and verbal SDQII scale scores using structural equation modeling. Since the unobserved achievement variables are each represented in the model by one observed variable, the variances of the observed achievement variables were fixed to represent appropriate reliability estimates. In general, model fit can often be improved by adding correlations between uniquenesses, or error terms, in the model. With this in mind, four models were tested: (a) the default null model, in which no relationships were posited among the observed variables; (b) model 1.0, the I/E model as proposed by Marsh (1986) with no correlated uniquenesses (i.e., error terms); (c) model 1.1, with correlated uniquenesses between the two self-concept latent variables (i.e., hypothesizing that math and verbal self-concept have common sources of unexplained variance); and (d) model 1.2, which included two additional correlated uniquenesses/error terms among the measured self-concept variables. From a practical standpoint, the three versions of the model are structurally similar in most practically important ways. Their only variation is found in the way that the models explain correlations among error terms, which is common in structural equation modeling.

Multigroup comparisons. In order to investigate the applicability to adolescents who are gifted of Skaalvik and Rankin's (1992) findings regarding similarity in perceived competence, the second phase of the analyses involved splitting the sample into three groups: (a) students scoring above 570 on the SAT math test and 500 or higher on the SAT verbal test ($n = 30$, 23%); (b) students scoring 500 or above on the math test and below 500 on the verbal test ($n = 65$, 50%); (c) and students scoring 500 or higher on the verbal test and below 580 on the math test ($n = 36$, 28%). These classifications allowed us to test whether specific parameters were equivalent across students with high math and

verbal skills, with a relative strength in math, and with relative verbal strengths (i.e., multiple potentialities vs. specific strength areas). The invariance of these models was tested across the three groups using multigroup structural equation modeling.

RESULTS

DESCRIPTIVE STATISTICS

Reliability estimates were acceptable for the purposes of this study (math $\alpha = .89$, verbal $\alpha = .89$) and were similar to those observed by Plucker et al. (1997) with another sample of talented young adolescents. Additional descriptive statistics are presented in Table 1. The present sample had higher means on the math and verbal self-concept than the Plucker et al. sample, which may be due to the more specific identification criteria of the present sample: Students in the present sample were identified solely by their test scores, while the Plucker et al. sample was chosen with additional criteria, such as personal essays, teacher recommendations, and grades.

BASIC MODEL

Table 2 contains the results of the initial model testing. The degree to which a model works to explain a given set of data is indicated by goodness-of-fit statistics. Although guidelines for interpreting fit statistics vary, several statisticians recommend that a variety of indicators be used. In this study, we used the chi square of each model divided by the degrees of freedom (with values up to 2 or possibly 3 indicating a good fit), the root mean square error of approximation (RMSEA, values from 0 to .5 or even .8 indicating good fit), the normed fit index (NFI, values in excess of .9 indicating good fit), the Tucker-Lewis index (TLI, values of .9 or higher indicating good fit), and the Akaike information criterion (AIC, a measure of fit used to compare models, with lower values indicating a better fit than higher values). The results presented in Table 2 provide evidence that model 1.2 is associated with the most impressive goodness-of-fit estimates, although all three models have similar estimates.

Table 3 contains the parameters for each model. As has been observed in several studies, the relationship between math and verbal self-concept scores appears to be positive and small. In contrast to previous research, however, the correlation between math and verbal achievement is also very small (i.e., not statistically different from 0). Additional descriptive analyses (i.e., investigation of histograms and descriptive statistics) were conducted to determine whether the correlation was attenuated due to low reliability, suffering from range restriction, or due to a lack of normality in each score's distribution. All three possible statistical explanations for the lack of correlation were examined and found to be without merit.

The other relevant parameters in model 1.2 were similar to those predicted by the I/E model. The math achievement–math self-concept and verbal achievement–verbal self-concept parameters were positive, moderate in magnitude, and statistically significant, while math achievement–verbal self-concept and verbal achievement–math self-concept parameters were negative, statistically significant, and smaller than the math–math and verbal–verbal estimates.

MULTIGROUP COMPARISONS

In order to test the hypothesis that the model was similar for students with varying areas of strength, the same model (i.e., Model 1.2) was tested with all three groups at the same time. This base level information (Table 4) was then compared to subsequent models in which the parameters of interest were fixed across all three groups. For example, to test whether the relationship (i.e., path coefficient) between math achievement and math self-concept was invariant among the three different groups of students—students with math strengths, with verbal strengths, and with strengths in both areas—the math achievement–math self-concept path coefficient was fixed to be identical in all three groups. The results of the all-free-parameters model ($\chi^2[145] = 186.34$) were subtracted from the results of the fixed variable model ($\chi^2[148] = 194.11$) to arrive at $\chi^2(3) = 7.77$, which was not statistically significant at an alpha level of .01 (i.e., we should not reject the hypothesis that the

TABLE 1
Descriptive Statistics and Reliability Estimates for SDQII Scale Scores

Scale	Descriptive Statistics					Reliability Estimates	
	Mean	SD	Kurt ^a	Skew ^a	Mean from Plucker et al.	Alpha ^b	SEM ^b
Math	5.06	.71	2.23	-1.41	4.64	.89	.24
Verbal	5.03	.82	.41	-.96	4.86	.89	.27

Note: Mean from Plucker et al. (1997) is provided for comparison purposes.

^a Kurt = kurtosis (standard error = .42); Skew = skewness (standard error = .21). ^b Alpha = Cronbach's alpha; SEM = standard error of measurement.

model. In addition, we examined the invariance

TABLE 2
Goodness-of-Fit Estimates for Tested Models

Model	Goodness-of-Fit Indices ^a							
	χ^2	df	p	χ^2/df	NFI	TLI	RMSEA	AIC
Null	979.40	66	.00	14.84	—	—	.33(.31-.35)	1003.40
1.0: basic model	105.82	51	.00	2.08	.892	.922	.09(.06-.12)	159.82
1.1: basic model with self-concept uniquenesses correlated	101.63	50	.00	2.03	.896	.925	.09(.06-.11)	157.63
1.2: model 1.1 with additional correlated uniqueness	68.92	48	.03	1.44	.930	.969	.06(.02-.09)	128.92

Note: Model 1.0 has no correlated uniqueness and is the basic model represented in Figure 1. Model 1.1 points a correlation between the uniqueness of the self-concept latent variables (i.e., the measurement error for math and verbal self-concepts is related), and Model 1.2 includes both the self-concept latent variable uniqueness correlation and correlations between the uniquenesses of the math 2—math 3 and math 2—verbal 1 variable points (i.e., these variables share common sources of measurement area).

^aNFI = normed fit index (Bentler-Bonett Index); TLI = Tucker-Lewis Index; RMSEA = root mean square root of approximation (parenthetical values represent 90% confidence interval); AIC = Akaike Information Criteria.

parameter is the same across the three groups of students). Based on these analyses, we are not prepared to state that the relationship between achievement and self-concept for the three groups differed.

This process was repeated for each of the major coefficients of interest, specifically those between the major latent variables in the I/E

of all of the major parameters collectively (the All Parameters Fixed model in Table 4). For all but one of these models, results did not suggest that the hypothesis of invariance could be rejected. The only exception was the correlation between math and verbal achievement, which was expected due to the fact that this correlation was the basis for our distinction between the

TABLE 3
Relevant Parameter Estimates for Tested Models

<i>Model</i>	<i>Relevant Parameters^a</i>					
	<i>MACH VACH</i>	<i>MACH MSC</i>	<i>VACH VSC</i>	<i>VACH VSC</i>	<i>VACH MSC</i>	<i>MSC VSC</i>
Null	—	—	—	—	—	—
1.0 basic model	-.032	.494	.429	-.367	-.247	—
1.1: basic model with self-concept uniqueness correlated	-.032	.497	.431	-.371	-.251	.209
1.2: model 1.1 with additional correlated uniquenesses	-.032	.500	.428	-.366	-.237	.151

Note: MACH-VACH is a correlation between the unobserved math and verbal achievement variables, and MSC-VSC is a correlation between the self-concept score uniquenesses; all other parameter estimates represent path loadings in the basic model.
^aMACH = math achievement (SAT math); VACH = verbal achievement (SAT verbal); MSC = math self-concept; VSC = verbal self-concept.

three groups of students (i.e., we used this difference to classify the students' data into the three groups). The multigroup invariance testing provided considerable evidence that the internal/external frame of reference model explained the development of gifted adolescents' self-concept in similar ways for students with both specific and general academic strengths.

DISCUSSION

These results confirm that the internal/external frame of reference model may be an appropriate framework with which to view the development of self-concept for adolescents who are gifted identified under standardized conditions (i.e., as opposed to the more ambiguous identification criteria used by Williams and Montgomery [1995]). The major implication of the model is that educators should not expect children who are gifted to have high subject-specific self-concepts in all subjects in which they excel. To the contrary, mathematics achievement was negatively related to verbal self-concept, as was verbal achievement and math self-concept to a lesser extent. Educators need to keep in mind that in-

ternal comparison processes are at work within students who are gifted, and that high achievement does not necessitate correspondingly high self-concept. For example, a student with high mathematics achievement will probably have a high math self-concept, but her verbal self-concept may be depressed as a result—*regardless of her verbal achievement*.

The data also suggest that the model was as effective in explaining the self-concept development of students with particular strengths in mathematical or verbal domains as it was for explaining the self-concept development of students talented in several content areas. This finding is important, since it contradicts Skaalvik and Rankin's (1992) hypothesis that the I/E model is not applicable to children with domain-similar competency perceptions, such as those indicated by many students who are gifted. In other words, the same internal comparison processes appear to exist within students with specific content expertise *and* students with a broader range of exceptional achievement.

The major discrepancy between the results of the present study and previous research with general ability populations is the very small cor-

TABLE 4

Statistical Tests for Structural Differences Among Students with High Math, High Verbal, and Both High Math and High Verbal SAT Scores

<i>Model</i>	<i>df</i>	χ^2	Δdf	$\Delta\chi^2$	<i>p</i>	<i>Decision</i>
All parameters free	145	186.34				
All parameters fixed	155	201.82	10	15.48	>.10	Fail to reject
Math achievement—Math self-concept parameter fixed	148	194.11	3	7.77	>.05	Fail to reject
Verbal achievement—Verbal self-concept parameter fixed	150	194.73	5	8.39	>.10	Fail to reject
Math achievement—Verbal self-concept parameter fixed	146	187.68	1	1.34	>.20	Fail to reject
Verbal achievement—Math self-concept parameter fixed	146	186.35	1	.01	>.90	Fail to reject
Math achievement—Verbal achievement correlation fixed	148	197.28	3	10.94	<.02	Reject

relation between math and verbal achievement. With respect to sampling issues, we suspect that the lack of substantive correlation is sample-specific and may not be replicable with gifted students identified using other means besides out-of-level testing with the SAT. Regarding methodological issues, the possibility exists that previous research investigating the I/E model has not utilized achievement measures with sufficiently high ceilings for use with academically talented students. Given the reported SAT score

distributions of similar samples of talented students identified using the Talent Search model (e.g., Ablard & Lipschultz, 1998), we suspect that the absence of a ceiling effect may be the cause of the anomaly. Students tested well out of level are not subject to a ceiling effect, and their scores appear to be normally distributed—again, both in this sample and in other samples identified using Talent Search techniques.

THE ROLE OF MULTIPLE INSTRUCTIONAL CONTEXTS

A third area of interest was whether the I/E model could adequately describe the development of math and verbal self-concepts for gifted students participating in challenging, extracurricular academic programs. Although this study addressed this issue only indirectly (i.e., only self-concept was measured during the program,

Educators need to keep in mind that internal comparison processes are at work within students who are gifted, and that high achievement does not necessitate correspondingly high self-con-

not achievement), we found evidence that the I/E model was effective for explaining the self-concept development of this select group of students.

This last result leads us to a discussion of the importance of instructional contexts on gifted students' self-concepts. Students who are gifted spend their academic lives in a variety of instructional (i.e., external) contexts (see Stocking, 1998). In addition to the regular classroom, they attend after school, weekend, and summer programs, all which allow the talented adolescent to interact with a different peer group than is found in regular classroom settings. An interesting extension of the I/E model would be to cover multiple assessments of self-concept and achievement over multiple contexts, such as the regular classroom and an intensive summer program. Comparing the same model to students of average ability would also be of interest. As Marsh et al. (1995) note, the impact of a particular instructional context on gifted adolescents' academic self-concepts may be influenced by the method for selecting participants for a program, the ability of the teacher to work with academically talented students, and the level of competition, type of curriculum, and assessment strategies the students encounter within the program.

Marsh et al. (1995) discussed these variables in terms of preadolescents' participation within one instructional context, which reflects the usual practice of researchers in gifted education to focus solely on one context (e.g., the current study; Brounstein, Holahan, & Dreyden, 1991; Dauber & Benbow, 1990; Hansen & Hall, 1985; Olszewski, Kulieke, & Willis, 1987; Plucker et al., 1997). Several researchers have also investigated the role of concurrent contexts, comparing the self-concepts of students in classes for the gifted and mixed ability classes (e.g., Chan, 1988; Kulik & Kulik, 1992; Schneider, Clegg, Byrne, Ledingham, & Crombie, 1989; Zeidner & Schleyer, 1999). However, talented adolescents may participate in many such contexts over the course of the calendar year. Since these programs may vary considerably with respect to the variables suggested by Marsh et al. (1995), and given the support for the importance of context in the literature (i.e., the

studies cited previously all suggest that "context matters"), the case for investigating the role of multiple instructional contexts during the development of gifted adolescents' math and verbal self-concepts is strengthened. Of course, this research will not be without problems, since much of the learning that occurs in many special programs may not be readily measured by achievement tests, and current self-concept measures may not be as sensitive to change as required for this type of research.

EXTERNAL COMPARISONS

The presence of external processes is often implied in examinations of the I/E model (e.g., the present study; Skaalvik & Rankin, 1992, 1995). However, given the potential importance of instructional context on gifted students' affective development, the formal inclusion of external variables (i.e., perceptions of peer math and verbal competence) may be helpful. While collecting this data poses certain logistical problems, they are not insurmountable. A possible model for extending this research appears in Figure 2. Although this model appears to be complex, we believe it is a more informative model for understanding academically talented adolescents' academic self-concept development than the basic I/E model. In fact, considering that many adolescents who are gifted participate in special programs *during* the school year, the perceived competencies of students' peers in those programs could be added to the model.

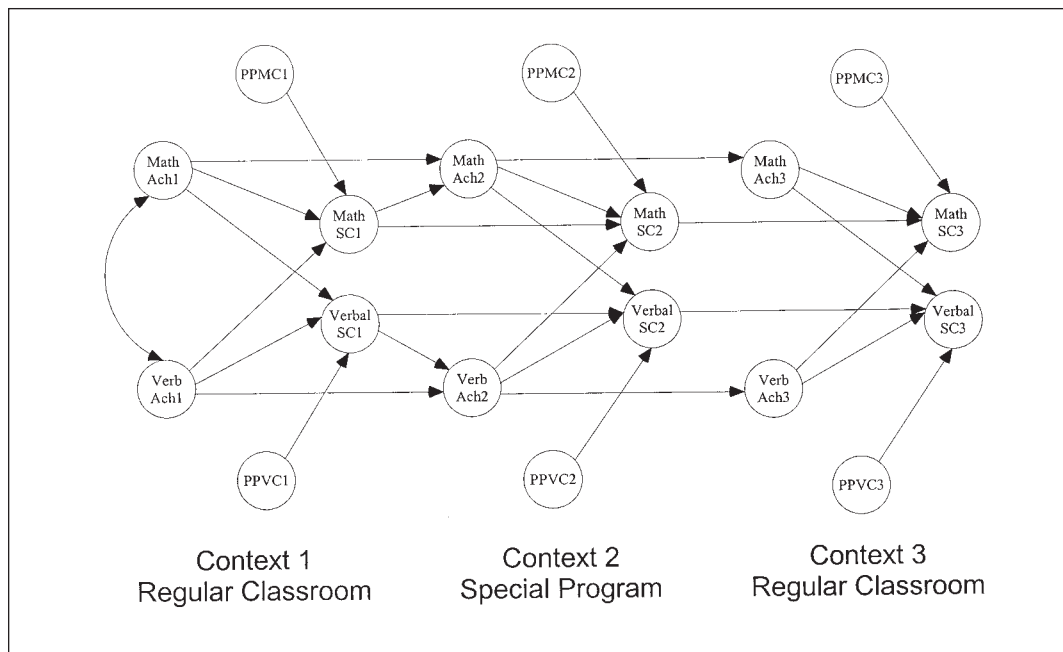
ADDITIONAL FUTURE DIRECTIONS

In this article, we addressed one specific model of self-concept development, the internal/external frame of reference model, and used one achievement and one self-concept measure to do so. Other potentially relevant models and instruments exist, and these should also be examined. For example, Pyryt and Mendaglio (1994) have proposed a multidimensional model of self-concept that differs from that used in this study and may provide different avenues for explaining gifted adolescent's self-concept development.

Of course, the study of gifted adolescents' self-concept development should not focus solely

FIGURE 2

Extended I/E Model for Examining Effects of Multiple Instructional Contexts in Gifted Adolescents' Self-concept Development



Note: Math Ach = Mathematics Achievement; Verbal Ach = Verbal Achievement; Math SC = Math Self-concept; Verbal SC = Verbal Self-concept; PPMC = Perceived Peer Math Competency; PPVC = Perceived Peer Verbal Competency. Contexts 1 and 3 represent subsequent academic years, while Context 2 represents an intervening summer program.

on academic self-concept. Future work should extend this model to address the influence of academic self-concept on the development of nonacademic dimensions, such as self-concept in peer relations, physical attractiveness, and inter- and intrapersonal relations. For example, studies of peer processes (Cooley et al., 1991; Cornell et al., 1990) suggest that positive self-concept may be important for positive peer status within a program for the gifted, which may be especially salient for talented adolescents experiencing loneliness or rejection-providing an affective justification for examination of external comparison processes across instructional contexts. Other affective variables, such as intrinsic motivation, may also provide additional insight into talented students' development. These variables should be incorporated into developmental models (e.g., see Skaalvik & Rankin, 1995) to provide a fuller understanding of the unique developmental experiences of being intellectually talented.

IMPLICATIONS FOR PRACTICE

The internal/external frame of reference model proposed by Marsh for general ability samples of students appears to be appropriate for use with students who are gifted. Interestingly, the model worked well for explaining the self-concept development of the three groups of students in this study (i.e., those strong in mathematical but not verbal areas, those strong in verbal but not mathematical areas, and those strong in both areas), with no relevant structural differences in the model among the three groups.

Educators and parents should be aware that, regardless of variations in academic achievement profiles, gifted adolescents' academic self-concepts result from internal processes (i.e., comparing one's achievement in one area to achievement in other areas) and external processes (i.e., comparing one's academic performance to that of peers). High achievement in one area may positively influence self-concept in that same area, but it will probably have a nega-

The results of this study suggest that the conventional wisdom of academically talented students seeing themselves in a uniformly positive light is misguided.

tive influence on self-concept in other areas. The results of this study suggest that the conventional wisdom of academically talented students seeing themselves in a uniformly positive light is misguided: Students who are gifted apparently see themselves as complex, multifaceted people, even within the area of academic performance, and educators and parents should try to see them in the same light. In other words, adolescents who excel at similar levels in different academic domains, such as math and English, may not see themselves as being equally successful and talented in both areas. Both internal factors, such as personal achievement in other content areas, and external factors, such as the attitude of teachers and parents and the achievement of peers, influence the way that students interpret their abilities.

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Iowa, on May 20, 1998; and the NAGC annual meeting, Louisville, Kentucky, on November 14, 1998.

This research was supported by the Duke University Talent Identification Program.

The authors acknowledge the contributions and feedback provided by Patrick Curran, Joe Spinazzola, Andrea McNeely, Gwen Dueker, Courtney Pierce, Andrea Smith, and anonymous reviewers of earlier versions of this work. The authors also appreciate the feedback provided by Symposium and NAGC participants, especially Samuel Whalen and Michael Pyryt.

Manuscript received May 2000; accepted November 2000.

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Portions of this article were presented at the Henry B. & Jocelyn Wallace National Research Symposium on Talent Development, Iowa City,



ISSN NO. 2320-5407

Journal homepage: <http://www.journalijar.com>

INTERNATIONAL JOURNAL
OF ADVANCED RESEARCH

RESEARCH ARTICLE

Relationship between Self-concept and Self-esteem in adolescents

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Manuscript Info

Manuscript History:

Received: 12 December 2013
Final Accepted: 19 January 2014
Published Online: February 2014

Key words:

*Corresponding Author

Dr.Rekha Srivastava

Abstract

she is subjected to many different challenges, stressors, and opportunities. An important factor in handling these challenges is a positive self-concept and high self-esteem. The objective of the study is to see the relationship between academic self-concept, and self-esteem of urban and rural boys and girls in high and low facility school. It was hypothesized that academic self-concept and self-esteem of urban and rural boys and girls in both high and low facility schools were positively correlated. The population for the study was consisted of 400 students comprising 200 boys and 200 girls. Age range of the respondents was 12 to 14 years. To measure academic self-concept, Indian adaptation of Marsh Academic Self -Description Questionnaire II (ASDQ) was used. Similarly to measure self-esteem, Indian adaption of the Rosenberg self-esteem questionnaire by Srivastava & Joshi (2007) was used. The result of the study revealed that there are positive correlation between academic self-concept and self-esteem of urban and rural boys and girls in both high and low facility schools.

As a child goes
through adolescence, he or

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Introduction

Self-concept and self-esteem are two crucial components of our lives. These components can shape how we develop during childhood and affect who we become as adults. During childhood and adolescence, self-concept and self-esteem begin to develop. As such, it is important for adolescents to develop a positive self-concept and high self-esteem in order to better their chances for a happy and satisfying adulthood.

Self-Concept

Self-concept can be defined as “a person’s sense of self shaped through interaction with the environment and other people” [Shavelson, Hubner, and Stanton, 1976]. A positive self-concept is regarded as important for good mental health, improving academic achievement [Chapman, Tunmer, Prochnow, 2000; Guay, Marsh, Boivin, 2003], protecting against becoming a victim of bullying [Marsh, Parada, Craven, Finger, 2004], and is seen as a key aim of education. Although originally it used to be considered as a unidimensional construct. Shavelson, Hubner, and Stanton [1976] theorized that self-concept was multidimensional and hierarchically organized, with a global general self-concept at the apex and then split into two broader domains: academic self-concept [e.g. verbal, science] and non-academic [e.g. social, emotional]. Marsh and Shavelson [1985] further developed this model by splitting the academic portion into two specific domains: verbal self concept and mathematics self-concept. Research has since documented the multidimensional nature and the domain specificity of self-concept in academic [Marsh, Yeung, 1997; Byrne, Gavin, 1996], art [Vispoel, 1995], and sport [Marsh, Hey, Roche, Perry, 1997] settings.

Academic self-concept refers to an individual’s knowledge and perception of his or her level of competence or ability within the academic realm [Bong, Shaalvik, 2003]. Research has shown that one’s level of academic self-concept can influence factors such as course selection, long-term educational aspirations, educational attainment,

academic attainment, and academic achievement [Marsh & Hau 2003, Guay, Marsh, & Boivin 2003, Marsh, & Craven, 2006]. For example, Phillips [1984] showed that among equally able students, those with a low academic self-concept were portrayed by their teachers as lacking in persistence. In addition Marsh [1991] showed that the higher a student's academic self-concept, the more likely it was that the student intended to attend university. Furthermore, in a ten-year study, Guay, Larose and Boivin [2004] studied that a positive academic self-concept was associated with better educational outcomes. Interestingly, Marsh and colleagues [1995, 2004] have demonstrated that when highly successful students leave their regular academic settings and enter high ability settings, their self concept declines.

Self-esteem

Self-esteem continues to be one of the most commonly research concepts in social psychology (Baumeister, 1993; Wells & Marwell, 1976; Wylie, 1979). Teachers, administrators and parents are commonly concerned about student's self-esteem. Its significance is often exaggerated to the extent that low self-esteem is viewed as the cause of all evil and high self-esteem as the cause of all good (Manning, Bear & Minke, 2006). Self-esteem is associated with depression, anxiety, motivation and general satisfaction with one's life (Harter, 1986; Rosenberg, 1986). Given these associations, children and adolescents who lack self-esteem may be more dependent on their parents and have lower academic and vocational goals. Moreover the belief is widespread that raising an individual's self-esteem (especially that of a child or adolescent) would be beneficial for both the individual and society as a whole.

There is no shortage of ways to define self-esteem. Perhaps the simplest one is found in Webster's dictionary, which says that "self-esteem is satisfaction with oneself". The term self-esteem comes from Greek word meaning "reverence for self". The self part of self-esteem pertains to the values, beliefs and attitudes that we hold about ourselves. The esteem part of self-esteem describes the value and worth that one gives oneself. Simplistically self-esteem is the acceptance of us for whom and what we are at any given time in our lives.

Self-esteem is generally conceptualized as an assessment of one's own worth. According to Shaalvik (1990), self-esteem was defined as the individual's general feeling of doing well in school and his or her satisfaction with his or her achievement. Self-esteem can be defined as "an individual's attitude about him or herself, involving self- evaluation along a positive- negative dimension (Baron & Byrne, 1991). Most generally self-esteem refers to an individual overall positive evaluation to the self (Gecas, 1982; Rosenberg, 1990, Rosenberg et al., 1995). It is composed of two distinct dimensions, competence and worth. The competence dimension (efficacy based self-esteem) refers to the degree to which people see themselves as capable and efficacious. Self-competence as defined by Tafarodi and Swan (1995) "as generalized sense of one's own efficacy or power". The worth dimensions (worth based self-esteem) refers to the degree to which individuals feel they are persons to value. Self- worth is essentially accepting oneself unconditionally and having the feeling that one is worthy of living and attaining happiness. As stated by Nathaniel Branden (1992), if either self-competence or self-worth is absent, self-esteem is impaired. In the words of Nathaniel Branden, (1992) self-esteem is "the disposition to experience oneself as competent to cope with the basic challenges of life and as worthy of happiness. Similarly, Mc Devitt and Ormrod (2004) refer self-esteem to "feelings people have about their capability and worth". Reasoner (2005), defines self-esteem as "the experience of being capable of meeting life challenges and being worthy of happiness".

Self-esteem is divided into two types' viz., global self-esteem and specific self-esteem. Global self-esteem refers to an overall evaluation set with wide- ranging implication for self experience (Epstien, 1980). Specific self-esteem refers to self evaluation in narrowly defined domains (Rosenberg, 1979). Each of these levels of self-esteem can lead to useful predication. Global self-esteem scores may predict behavior across a wide range of situations, particularly when behavior is aggregated across many situations (Epstein, 1980, Epstein and O'Brien, in press). On the other hand, specific self-esteem scores may allow strong predication to be made in highly delimited behavioral domains (Cray, 1969; Bandura, 1982).

Studies related to academic self-concept and self-esteem

The bulk of researches related to self-esteem found that both self-concept and self-esteem are correlated. Franken (1994) suggested that self-concept is related to self-esteem and people who have good self-esteem have a clearly differentiated self-concept. Thus the one way of thinking about self-esteem is as evaluative function of the self-concepts.

Studies related to self-concept show that people with low self-concept have more poorly defined self-esteem. Evidence suggested that positive self-concept is closely associated with positive self-esteem (Farmer, 2001);

People who believe that they are good at a lot of things tend to feel better about them overall. Studies clearly mentioned that self-esteem and self-concept are deeply related so, many authors used these terms interchangeably. Although the terms self-concept & self-esteem are often used interchangeably but there is a wide difference between them. On the one hand self-concept refers to student perceptions of competence or adequacy in academic & non academic domains and on the other hand self-esteem is student's overall evaluations of him or herself including feelings of general happiness and satisfaction (Manning, Maureen A, 2007; Harter, 1999). According to Hattie (1992), Self-concept or self knowledge contains effective, descriptive components and answer the question who am I. Self-esteem or self evaluation contains effective, evaluative components and answer the question how do I feel about who I am (Brinthaupt & Lipka, 1992; Campbell & Lavellee, 1993). Self-esteem therefore could be understood as a concept referring to self-respect, own worth or self regard (Plug et al., 1989).

Bean and Lipka (1986) have reported the importance of values as a basis of beliefs about the self. Coppersmith (1967) and even James (1983) originally in 1980 stated that self evaluation compares against an ideal self of potential capabilities. Erickson (1950) described the ideal self as containing the standards and expectations taken into the self-concept. These studies suggest an internal kind of criteria for the individual in the self-concept. Self-esteem on the other hand is the individual's opinion evaluation of how the individual's measures up, or compares of that ideal self or internal criteria. It is described as a sense of self-worth, implying both a feeling as well as an evaluation. The word evaluation here suggests a cognitive consideration; it is resulting feeling of worth that contributes to an individual's level of self-esteem. This feeling of worth also reinforcing the fact that self-esteem is affective in nature as well as evaluative in quality. The evaluation that takes place confirms the notion that self-concept of cognitive in nature in addition to having a criterion quality as well.

Mwamwenda (1995) added to the definition when he says that self-concept is a person's way of perceiving himself/herself, which may be either positive or negative as a result of self-evaluation. According to Dembo (1994) as well as Biehler and Snowman (1997) self-esteem is the value or judgment individual place on their behavior. The academic self-concept is how I see myself, while self-esteem is how I feel about myself. The two terms are inseparable since self-esteem is based on the self-concept and explains how one feels about oneself. Consequently the terms are often used interchangeably in educational literature. Self-concept or self-esteem is achieved by comparing oneself with peers or with admired others or form a history of success or failure.

It can be concluded that self-concept is a broad construct that includes cognitive, affective and behavioral aspects. On the other hand self-esteem is comparatively limited construct that includes evaluative aspects. Self-esteem is regarded as a confidence and satisfaction in oneself. It is considered to be the overall value that one places on oneself as a person, whereas self-concept is viewed as the body of self knowledge that individuals possess about themselves. Hence self-esteem is an evaluative term and self-concept is a descriptive term. Thus self-concept and self-esteem are distinct construct of the self that are at the same time theoretically relate

METHODOLOGY

Simple descriptive survey method has been employed to study and compare the variables under the study.

POPULATION (UNIVERSE)

The urban and rural adolescents studying in class VIII, IX and X in various secondary schools/ inter colleges aged 12 to 14 years of Varanasi city. A total of sixteen schools affiliated to C.B.S.E. board were obtained from the periphery of the Varanasi district. Eight schools were categorized as high facility and eight schools were categorized as low facility schools.

SAMPLE

The sample of present study consisted of four hundred urban and rural adolescents studying in different types of schools, employing 2 (area) x 2 (area) x 2 (sex) factorial design. For each area (rural and urban), an equal number of adolescents from high and low facility of schools were drawn. There were two hundred subjects in each area equally divided into fifty subjects in each category of schools. To ensure the representiveness of schools, equal number of boys and girls in each group were sampled from high and low facility schools. This resulted in a 2 (area) x 2 (school) x 2 (sex) distribution of the sample in a factorial design. Schools were categorized as high facility and low facility on the basis of sixteen indices of physical and educational opportunities available in them (Shukla & Mishra, 1993). The categories were given 'two' or 'one' points on each index and a median split on the index (i, e., 24) was

used as criterion for distinguishing between high and low facility schools. These indices were- location of school (open area-congested area), building (good-poor), space (sufficient-insufficient), furniture (good-ordinary), physical amenities such as electricity and running water (adequate-inadequate), teaching aids (sufficient-insufficient), facility for games and sports (adequate-inadequate), staff (permanent-temporary), teachers training (mostly trained-untrained), method of instructions (active-passive), teacher-student interaction (good-poor), discipline (good-poor), extracurricular activities (sufficient-insufficient), school uniform (proper-improper), health facility (sufficient-insufficient), and conveyance facility (sufficient-insufficient). Thus schools which contained good building, had a proper space and physical amenities, provided adequate visual aids, facilities for games and sports, recreational and extracurricular activities, conveyance and health facilities and trained personnel etc. were put in the category of high facility schools. On the other hand, the schools which were lacking in or were not equipped with the above facilities were regarded as low facility schools.

Area was categorized as urban and rural. The area which comes under municipal's undertaking was considered known as urban area. Rural area had been defined as the area which is situated 15 km. away from the centre of the city and included under Gram Panchayat. The occupation of the people in rural area was mainly agriculture based. In this area conveyance facility was not easily available and the people usually follow traditional way of life. Another feature of rural area was the absence of civic amenities such as absence of clear water supply, transportation facility, and sanitation etc.

Table-1 Sample Distribution (N=400)

Area	High Facility school		Low facility school	
	Boys	Girls	Boys	Girls
Urban	50	50	50	50
Rural	50	50	50	50

Interview Schedule

A semi - structured interview schedule was prepared by the researcher to gain information about the schools. For this purpose, nine different set of informations were obtained viz., (a) location of school (b) mode of transport of coming to school (c) student's residence (d) distance of school from cantt station (e) number of adolescents belong to remote areas (f) whether school comes under gram panchyat or nagar nigam (g) parents' occupation (h) whether conveyance facilities are easily available or not in the area (i) status of civic amenities in that area.

The Academic self-description questionnaire II (ASDQ II)

Academic self-description Questionnaire:

To measure academic self-concept, Indian adaptation of Marsh academic self- description questionnaire II (ASDQ II), was developed during the present investigation was used. The scale consisted of ten dimensions or subscale viz., English, Hindi, Sanskrit, Mathematics, History, Geography, Computer, Science, Arts and overall school subjects. The total number of items in this questionnaire were 60 which have to be rated on six point scale ranging false to true. Item- total correlation of each scale was calculated which ranges from 0.84 to 0.86.

The Rosenberg self-esteem Questionnaire:

To measure self-esteem, Indian adaptation of Rosenberg self-esteem questionnaire developed by Prashant & Arora (1988) was used. The scale consisted of 10 items in which half of items are positively worded and half are negatively worded. The items were scored on a four point scale from strongly agree to strongly disagree. The reliability of the Indian version of the scale was 0.80.

Objectives:

To study the relationship between academic self-concept and self-esteem of urban and rural boys and girls in high and low facility school.

Hypothesis :

Academic self-concept and self-esteem of urban and rural boys and girls in high and low facility schools would be positively correlated.

Analysis:

The correlation coefficient is utilized to examine the relationship between academic self-concept and self-esteem. Results are presented in Table2.

Table-2 Correlation between academic self-concept and self-esteem of urban and rural boys and girls in high and low facility schools

Variable	High and Low facility school	Urban and Rural area	Boy and Girls	Total
Self-esteem	.197** (.092)	.136 (.195**)	.136 (.236**)	.168**

**P<.01

Note: Figures in parenthesis indicate the correlation between academic self-concept and self-esteem in low facility school, rural area and girls.

The result reveals that academic self-concept was found to be significantly positively correlated with self-esteem scores only in high facility school ($r = .197$, $p < 0.05$), rural area ($r = .195$, $p < 0.01$) in girls ($r = .236$, $p < 0.05$) and for total sample ($r = .168$, $p < 0.01$). No such correlation was found in low facility school, urban area, and boys (Table 2).

Further, the correlation co-efficient was also performed for each subgroup. No such correlation was found in urban boys with high facility schools($r = .079$), rural boys with high facility schools($r = .265$), urban boys with low facility schools($r = .075$), urban boys with low facility schools($r = .031$), urban girls with high facility schools($r = .114$), rural girls with high facility schools($r = .076$), urban girls with low facility schools($r = .237$) and urban girls with low facility schools($r = .029$).

An overall result indicated that academic self-concept was significantly positively correlated with academic achievement. It implies that adolescents having high academic self-concept would have high self-esteem. The hypothesis that academic self-concept and self-esteem of urban and rural boys and girls in both high and low facility schools would be positively correlated has been partially supported by the results.

The present result is confirmed by the past researches related to self-esteem that both self-concept and self-esteem is correlated. Franken (1994) suggested that self-concept is related to self-esteem and people who have good self-esteem have a clearly differentiated self-concept. Studies related to self-concept show that people with low self-concept have more poorly defined self-esteem. Evidence suggested that positive self-concept is closely associated with positive self-esteem (Farmer, 2001). Yu Wei Chu (2002) reported that self-esteem scores were positively correlated with domain specific self-concept (academic self-concept) scores. People who believe that they are good at a lot of things tend to feel better about them overall. Ashtiani, Ejei, Khodapanahi and Hamid Tarkhoran (2007), indicated that self-concept is correlated with self-esteem and these two have positive impacts on augment of academic achievement.

The result of this study signified that self-concept and self-esteem are relevant; it means that any increase in self-concept will amplify self-esteem and these results are correspondent with the researches results of Kaplan *et al.* (1995) and Dishman *et al.* (2006). These two components have a momentous role in personality. Thus in terms of these survey's result people with high self-concept and self-esteem respect and themselves, have high adaptability, are capable in initiating good motive relations with others, take part in creational works have an active role social groups and are endowed with high self confidence.

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Attachment Style and the Mental Representation of the Self

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Six studies examined the association between attachment style and several aspects of the mental representation of the self in adolescents. Studies 1 and 2 focused on the hedonic tone of the self-structure, Studies 3 and 4 focused on its complexity, and Studies 5 and 6 focused on discrepancies between domains and standpoints of the self. Results indicated that secure and avoidant persons had a more positive view of themselves than anxious-ambivalent persons. In addition, secure persons were found to have a more balanced, complex, and coherent self-structure than insecure persons, either avoidant or anxious-ambivalent. The discussion emphasizes the connection between the internalization of attachment experiences and the construction of the self.

Research on adult attachment uses Bowlby's (1973) construct of *working models*—mental representations of attachment figures and the self—to explain how past interactions with significant others influence social and emotional development. Initial studies of adult attachment focused on the way people think about and behave in their relationships (e.g., Hazan & Shaver, 1987). The present series of studies focuses on a neglected aspect of attachment working models: the mental representation of the self.

Attachment Theory and Research

Attachment theory (Bowlby, 1969, 1973, 1980) proposes that the quality of infant-caregiver interactions results in mental working models that organize cognitions, affects, and behavior in later relationships; guide affect regulation; and shape self-image. Following these ideas, Hazan and Shaver (1987) examined attachment working models in adults, using the tripartite classification of infant attachment style (Ainsworth, Blehar, Waters, & Wall, 1978). The *secure style* is defined by confidence in the availability of attachment figures in times of need, comfort with closeness, interdependence, and trust. The *avoidant style* is characterized by insecurity in others' intentions and preference for emotional distance. The *anxious-ambivalent style* portrays a strong desire for intimacy together with insecurity about others' responses to this desire and high fear of rejection. Hazan and Shaver (1987) found that self-reports of adult attachment style were related to reports of parent-child attachment. Adults who defined themselves as secure in their close relationships reported more secure interactions with their parents than adults who described themselves as insecure, either avoidant or anxious-ambivalent.

Building on Hazan and Shaver's (1987) work, a wealth of studies have assessed several correlates of adult attachment

style. Attachment groups have been found to differ in perceptions, expectations, and functioning in close relationships (e.g., Brennan & Shaver, in press; Feeney & Noller, 1990; Mikulincer & Erev, 1991; Pietromonaco & Carnelley, 1994). In addition, attachment style has been found to be related to affect regulation (Mikulincer, Florian, & Tolmacz, 1990; Mikulincer, Florian, & Weller, 1993; Mikulincer & Orbach, 1995; Simpson, 1990; Simpson, Rholes, & Nelligan, 1992). Secure people seek social support in times of need and rely on constructive coping strategies to regulate affect. Insecure people rely on less constructive ways of coping and are less able at regulating affect. Whereas avoidant people rely on repressive and withdrawal strategies, anxious-ambivalent people rely on emotion-focused coping that increases rather than decreases distress.

The present study examines Bowlby's (1973) idea that attachment experiences shape a person's self-image. In his words, people rely on attachment experiences as a source of information for learning about themselves. Sroufe and Fleeson (1986) proposed that components of the attachment figures are incorporated into the self through the learning of roles within the relationship. Thus, the more people feel secure in their relationships, and the more they feel valued by others, the more they come to feel valuable and special. Conversely, people who feel rejected by others may feel worthless and of little value.

Four adult attachment studies support the above hypothesis (Bartholomew & Horowitz, 1991; Collins & Read, 1990; Feeney & Noller, 1990; Griffin & Bartholomew, 1994). Secure adults have been found to have higher self-esteem than anxious-ambivalent people. With regard to avoidant adults, the findings are more ambiguous. Although Feeney and Noller (1990) and Griffin and Bartholomew (1994) found that avoidant people have a more negative self-image than secure people, Collins and Read (1990) found no difference between these two groups.

The problem with the above studies is that they focused on a single aspect of the self-system: self-esteem. This is a narrow view that ignores the complexity of the self-construct. In fact, these studies did not address current definitions of the self as a cognitive structure (e.g., Kihlstrom & Cantor, 1984; Markus & Wurf, 1987; Rogers, 1981), which is assumed to include a large number of self-relevant data that are organized into a

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hierarchy of representations, each one reflecting a more or less inclusive aspect of the self. Moreover, they did not take into account Higgins' (1987) hypothesis that each self-representation includes information about different domains of the self (e.g., actual, ideal) and standpoints of the self (the person's own view, others' views). The present series of studies attempts to provide information on the association between attachment style and the following aspects of the self-structure: (a) the content of the attributes that people use in thinking about themselves, (b) the organization of these attributes into self-representations, and (c) the correspondence between domains and standpoints of the self.

Attachment Style and the Self-Structure

Hedonic Value

The first set of hypotheses concerns the habitual hedonic valence of the self-structure. When thinking about themselves, people may use positive and negative attributes that would determine the hedonic tone of their self-appraisal and their subsequent responses (e.g., Markus, 1977; Markus & Wurf, 1987). This hedonic tone may vary within the person across situations and over time, depending on the attributes that become accessible in the self-structure by a real experience or by associations with other attributes (Markus, 1977). However, it may also vary among individuals; some people habitually think of themselves in positive terms, whereas others describe themselves in negative terms. These individual differences are directly reflected in the person's self-esteem and chronic mood (Bargh & Tota, 1988; Beck, 1976; Segal, 1988; Segal & Vella, 1990).

I hypothesized that people differing in attachment style would differ in the hedonic tone of their self-structure. Secure people, who felt valued by their attachment figures (Shaver & Hazan, 1993), would think of themselves in positive terms. This is not to say that they cannot admit weak points of their self but that positive attributes would be more available in their self-structure. In contrast, anxious-ambivalent people, who grew up with doubts about their value in the eyes of significant others, would tend to use negative attributes when thinking about themselves. With regard to avoidant people, one could argue that their insecure attachment experiences would also be reflected in a negative self-view. However, avoidant people would have a more positive view of themselves because they cope with their insecurity by suppressing any thought that brings their weaknesses to mind (Mikulincer et al., 1993).

Self-Complexity

The second set of hypotheses concerns self-complexity. Following Schroder, Driver, and Streufert (1967), Streufert and Streufert (1978), and Tetlock and Suedfeld (1988), I consider the self-structure to be complex to the extent that it is characterized by a large number of differentiated self-aspects and the integration of these self-aspects. Thus, high self-complexity consists of a high degree of differentiation and a high degree of integrative organization.

Differentiation refers to the number of self-aspects (e.g., "myself as a student") that a person uses for organizing information

and to their degree of distinctiveness—the extent to which self-aspects include nonoverlapping information (Linville, 1985; Tetlock, 1983; Woike, 1994). Highly differentiated people organize their experiences through a large number of narrow, context-specific self-aspects. These people can distinguish between different parts of the self and analyze information using different perspectives. Less differentiated people categorize information into few, redundant self-aspects. These people have few options for analyzing information, and they are unable to prevent the spreading of the impact of experience with respect to one self-aspect to other aspects. Low differentiation has been found to be related to affective extremity and the spreading of negative affect over the self-structure (Linville, 1985).

Integration refers to the development of complex connections among differentiated self-aspects (Tetlock & Suedfeld, 1988). Highly integrated people possess superordinate categories that connect among the different self-aspects without canceling their uniqueness and contradictions. They can compare among self-aspects, appraise their interactions, confront trade-offs, and cope with contradictions in the self-structure. Less integrated people might have a fragmented self-structure, in which different self-aspects are like islands that have no relation or influence among them. These people cannot tolerate ambiguities and contradictions and tend to remain "stuck" in conflictual situations (Tetlock, Peterson, & Berry, 1993).

I hypothesized that anxious-ambivalent people would show lower differentiation of the self than secure and avoidant people. This difference may result from one source of self-differentiation: the pervasiveness of affect in self-structure (Pietromonaco, 1985). Pietromonaco stated that the self not only regulates affect but also its structure (e.g., level of differentiation) may be shaped by the way people experience and react to affect. Anxious-ambivalent people, who experience negative affect intensely and focus obsessively on their emotions (Shaver & Hazan, 1993), may become attuned to the affective nature of the information and consequently may organize their self-structure largely by using a simple affective criterion (whether the information makes one feel good or bad). This tendency may lead to the sorting of self-attributes into few, general affective categories, therefore resulting in low self-differentiation.

Secure people, who are able to prevent the spillover of negative affect (Mikulincer & Orbach, 1995), may sort information also according to other nonaffective criteria. They would sometimes rely on affective criteria and in other times encode information according to more narrow, context-specific content domains. That is, they could diversify the criteria that underlie the self-structure and thus show high self-differentiation. The same pattern may be shown by avoidant persons, who have been found to distance from any affective experience (Shaver & Hazan, 1993). Along this reasoning, differences among attachment groups in self-differentiation should parallel differences in the pervasiveness of affect in self-organization. These differences will also be examined in the present study.

With regard to the integration of the self, I hypothesized that it would be higher among secure people than among avoidant or anxious-ambivalent people. According to attachment theory, a "secure base" allows people to admit frustrating aspects of their experience and weak points of their self (Bowlby, 1988;

Sroufe & Fleeson, 1986). Moreover, it enables the incorporation of negative information into the self-structure so that people can understand the meaning of this information and cope with its consequences (Cassidy, 1988). In this way, secure people can recognize that their self includes both good and bad aspects that, despite their opposed implications, may coexist in harmony and may interact in shaping behavior. This confidence to reveal and synthesize strong and weak aspects of the self may be the germ for the growth of a highly integrative self-structure.

Along the same reasoning, the lack of a secure base may result in so fragile a self-view that people may be precluded from acknowledging negative experiences and revealing personal imperfections without feeling overwhelmed by them (Cassidy, 1988). Whereas avoidant people habitually deny negative experiences and suppress negative memories (Kobak & Sceery, 1988; Mikulincer & Orbach, 1995), anxious-ambivalent people are so overwhelmed by the negative aspects of their experience that they cannot recognize other positive aspects (e.g., Mikulincer & Orbach, 1995). In either case, the two insecure groups may be unable to admit that good and bad self-aspects can coexist in harmony and to tie them together in an integrative structure.

Self-Discrepancies

The third set of hypotheses concerns the matching among different facets of the self. As stated earlier, people encode information about different facets of the self. Higgins (1987) classified these facets according to two dimensions: domains of the self and standpoints on the self. The basic domains are the actual self—the attributes that someone believes the person possesses, the ideal self—the attributes that someone would like the person to possess, and the ought self—the attributes that someone believes the person should possess. The basic standpoints are the person's own view of his- or herself and his or her belief about the way significant others perceive him or her.

According to Higgins (1987), people are motivated to minimize discrepancies among different facets of the self. He also proposed that a discrepancy between two facets produces discomfort and that different kinds of discrepancy produce different types of distress. In support of this view, Higgins, Klein, and Strauman (1985), Higgins, Bond, Klein, and Strauman (1986), and Strauman and Higgins (1987) found that a discrepancy between actual and ideal selves was related to shame and depression, and a discrepancy between actual and ought selves was associated with anxiety, guilt, and fear of punishment.

My basic hypothesis was that avoidant and anxious-ambivalent people would show higher actual-ideal and actual-ought self-discrepancies than would secure people. According to Higgins (1987), children internalize parents' ideal-ought guidelines for them and try to meet these standards to avoid punishment and to achieve positive outcomes (e.g., parent's love). However, the meeting of these guidelines also depends on parents' responses to their children. On the one hand, children who feel loved and accepted by their parents may come to believe that they meet the internalized guidelines and may develop an actual self that matches their ideal-ought selves. This is the case of secure people who grew up in a warm and

accepting family milieu. On the other hand, children who are criticized or rejected by their parents may feel that they fail in avoiding negative outcomes or achieving positive ones and may develop actual selves that are discrepant from their self-guides. This is the case of insecure people who have experienced frustrating and negative interactions with their parents (e.g., Shaver & Hazan, 1993).

The above sets of hypotheses were examined in six studies. Studies 1 and 2 focused on the hedonic tone of self-structure, Studies 3 and 4 examined the complexity of self-structure, and Studies 5 and 6 focused on self-discrepancies. In the six studies, high school students completed Hazan and Shaver's (1987) scale of attachment style and other material tapping the assessed aspects of the self-structure. In the six studies, all the participants had experienced at least one romantic relationship, and they answered the attachment scale with regard to their romantic experiences.

Study 1

Study 1 examined differences among attachment groups in the hedonic tone of self-structure, as measured by the self-referent encoding task (SRET; Derry & Kuiper, 1981; Kuiper & Derry, 1982). Participants were asked to decide whether a number of positive and negative adjectives were self-descriptive. Then an incidental recall test of the adjectives was administered. The assumption underlying the recall test is that adjectives that are accessible in the self-structure would produce higher incidental recall than adjectives irrelevant to the self-schema (Rogers, 1981). I predicted that secure and avoidant people would choose and recall more positive and fewer negative self-attributes than would anxious-ambivalent people.

Method

Participants. One hundred and three high school students (61 females and 42 males ranging in age from 16 to 18) volunteered to participate in the study without monetary reward.

Materials and procedure. Participants were approached in classrooms and were tested in group sessions containing up to 30 individuals. They were told that they would participate in a study on self-perception. The order of the questionnaires was counterbalanced.

Attachment style was assessed by asking participants to read Hazan and Shaver's (1987) three descriptions of attachment styles and to endorse the description that best described their feelings.¹ Sixty-three percent of the participants ($N = 65$) classified themselves as securely attached, 24% as avoidant ($N = 25$), and 13% as ambivalent ($N = 13$).²

¹ Participants also answered the 15-item three-factor attachment scale (see Mikulincer et al., 1990, for details) and were assigned to the attachment style that had the highest value on the scale. In all the studies, there were less than 10% of mismatches between the two classification techniques. In cases of mismatches, participants were assigned to the style that they themselves had chosen. Statistical analysis demonstrated that the exclusion of mismatches from the sample made no change in the results of all the studies.

² No gender difference in the distribution of attachment styles was found in all the studies. In addition, results of all the studies did not change when gender was introduced as a covariate, and no significant Attachment \times Gender interaction was found.

The version of the SRET used in this study was similar to that used by Kuiper, Olinger, MacDonald, and Shaw (1985). Participants received a list of 30 positive adjectives and 30 negative, depression-relevant adjectives, drawn from Kuiper and Derry's (1982) work and translated into Hebrew by two bilingual psychologists. Pretests with Israeli participants demonstrated that positive and negative adjectives indeed differed in their hedonic value but not in their imagery value, word length, and word frequency. Participants were instructed that they would hear a list of adjectives and were asked to rate whether or not each adjective describes them. Then they were provided with a rating sheet containing 60 cue questions ("Does this adjective describe you?"); each adjective was read aloud by the experimenter, and participants made a yes-no decision on the rating sheet beside the corresponding cue question. The 60 adjectives were read in a random order. After all the 60 adjectives were read, participants were unexpectedly given 3 min to recall as many of the adjectives as possible, in any order they could. Participants wrote down the adjectives on the back of their rating sheets.

Results and Discussion

Self-referent judgments. The number of *yes* decisions in each adjective category (negative, positive) was analyzed with a two-way analysis of variance (ANOVA) for Attachment Style \times Adjective category. The last variable was a within-subject repeated measure. The ANOVA yielded a significant main effect for adjective category, $F(1, 100) = 936.77, p < .01$, such that participants made more *yes* decisions for positive traits ($M = 22.37$) than for negative traits ($M = 5.26$). The Attachment Style \times Adjective Category interaction also was significant, $F(2, 100) = 13.06, p < .01$. A test for simple main effects (Winer, 1971) and Scheffé tests showed that anxious-ambivalent participants endorsed more negative ($M = 8.92$) and fewer positive traits ($M = 19.00$) than secure participants ($M_s = 4.25$ and 23.05 for negative and positive traits, respectively) and avoidant participants ($M_s = 6.00$ and 22.40); $F(2, 100) = 9.44, p < .01$ for negative traits, and $F(1, 100) = 5.58, p < .01$, for positive traits. No difference was found between secure and avoidant groups.

Self-referent recall. The recall data were analyzed on the basis of Kuiper et al.'s (1985) procedure. Kuiper et al. assumed that positive self-referent recall includes the recall of positive traits that are endorsed as self-relevant in the SRET (*yes* rating) and negative traits that are not endorsed as self-relevant (*no* rating). Both are positive in the sense that participants judge themselves as possessing positive traits but not as possessing negative attributes. Accordingly, negative self-referent recall includes the recall of negative traits that receive a *yes* rating (possessing negative traits) and positive traits that receive a *no* rating (not possessing a positive trait).

On this basis, a positive score was computed by averaging two proportions: (a) recalled *yes*-rated positive words/total *yes*-rated positive words, and (b) recalled *no*-rated negative words/total *no*-rated negative words. Accordingly, a negative score was computed by averaging two proportions: (a) recalled *yes*-rated negative words/total *yes*-rated negative words, and (b) recalled *no*-rated positive words/total *no*-rated positive words. Then a *positivity recall score* was computed by subtracting the negative score from the positive score.

A one-way ANOVA yielded a significant effect for attachment

style on the positivity recall score $F(2, 100) = 6.95, p < .01$. Scheffé tests ($\alpha = .05$) revealed that anxious-ambivalent participants had a lower positivity recall score ($M = .30$) than did secure participants ($M = .58$). Avoidant participants ($M = .46$) did not significantly differ from secure participants.³

The findings show that the self-schema of ambivalent people is more negative than that of secure people: They described themselves in more negative terms, and their self-referent recall was more negative. As expected, the positivity of the self-schema of avoidant people did not differ from that of secure people. However, note that the above findings may also reflect avoidant people's response style (Ferguson, Rule, & Carlson, 1983) or a social desirability bias. These problems are addressed in Study 2, which examined the hedonic tone of self-structure while weakening the influence of response set.

Study 2

Study 2 also assessed the hedonic tone of the self-structure of attachment groups while addressing some of the confounds identified in the SRET. In this study, participants were not explicitly asked to think about their self-attributes, rather, they performed a self-irrelevant task (color-naming) while ignoring these attributes. Here, the hedonic tone of the self-structure was not tapped by the number of accessible positive and negative self-attributes but by the extent to which these attributes are automatically activated in the working memory and interfere with task performance (e.g., Segal, 1988).

Specifically, I used a modification of the Stroop Color-Naming task (Stroop, 1938). Participants were asked to name the color in which positive and negative self-attributes were written. Color-naming is known to be slowed when the representations of the words to be color-named are automatically activated and compete with color-naming for processing resources (e.g., Warren, 1972). Research has also revealed that the color-naming of traits that are chronically accessible in the self-structure is slower than that of traits irrelevant to one's self-view (e.g., Mathews & MacLeod, 1985). The former are likely to be automatically activated during their presentation in the Stroop task and then to interfere with color-naming. Given these findings, I predicted that anxious-ambivalent people would show longer color-naming latencies for negative self-attributes than for other word categories. In contrast, secure and avoidant people would show longer latencies for positive self-attributes than for other word categories.

Method

Participants. Sixty high school students (30 females and 30 males ranging in age from 16 to 18) participated in the study without any reward.

Materials and procedure. Participants were tested individually on two occasions. In the first session, a large sample of 169 participants completed the attachment style scale (see Study 1). Fifty-eight percent

³ Similar results were found when ANOVAs were performed on the positive and negative recall scores as well as on each of the computed proportion scores.

Table 1
Means and SDs of Color-Naming Latencies According to Type of Trait
and Attachment Style (Study 2)

Type of trait	Attachment style					
	Secure		Avoidant		Ambivalent	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-relevant						
Positive	82.60 ^a	13.23	92.00 ^b	10.93	69.15 ^{a,b}	10.15
Negative	79.25 ^a	12.71	67.80 ^b	14.92	84.85 ^a	12.19
Self-irrelevant						
Positive	64.85	8.97	65.75	9.46	67.00	10.51
Negative	66.90	11.39	65.40	8.19	67.85	11.96

^a Significantly different from avoidant participants.

^b Significantly different from secure participants.

of the participants classified themselves as secure ($N = 98$), 27% as avoidant ($N = 46$), and 15% as ambivalent ($N = 25$). To generate the item pool for the Stroop task, participants also rated the extent to which the 60 traits described in Study 1 were self-descriptive. Ratings were made on a 4-point scale ranging from 1 (*a little*) to 4 (*extremely*).

In the second session, 1 week later, 60 participants—20 secure, 20 avoidant, and 20 ambivalent—were randomly selected (within each group) to complete a version of the Stroop color-naming task (Mathews & MacLeod, 1985). The three attachment groups included equal numbers of men and women. Participants named the colors of words printed on four 20-line cards. On each card (56 cm × 70 cm) was printed a set of five words that were repeated 20 times throughout the card and printed in five different colors (pink, green, black, orange, blue). The words (1 cm high) were written with marking pens and appeared randomly on the 20 lines of a card. Words were randomized within pairs of lines so that a word appeared twice in two lines (although not sequentially). Ink color was randomly assigned to the words in the same manner.

The set of words used in the cards was different for each participant and was selected from their self-referent judgments. The cards were: (a) *self-relevant negative card*—five negative adjectives that a participant rated as highly self-descriptive (received a rating of 3 or 4), (b) a *control negative card*—five negative adjectives that a participant did not choose as descriptive of his- or herself (received a rating of 1), (c) a *self-relevant positive card*—five positive adjectives that a participant rated as highly self-descriptive (ratings of 3 or 4), and (d) a *control positive card*—five positive adjectives that a participant did not choose as self-descriptive (rating of 1).

The experimenter told participants that they would perform a perceptual task. They were instructed to name aloud the word colors as quickly and accurately as possible. They were told that they would be timed with a stopwatch. For each of the cards, the experimenter began timing when the first color name was announced and stopped at the last color name. The four cards were presented in a random order.⁴

Results and Discussion

Color-naming latencies were analyzed with a three-way ANOVA for attachment style, self-relevance of the card (self-relevant or control), and valence of the card (negative or positive). The two last variables were treated as within-subject measures. Table 1 presents relevant means and standard deviations of color-naming latencies (in seconds).

The ANOVA revealed a significant main effect for self-relevance of the card, $F(1, 57) = 69.49$, $p < .01$, with self-relevant cards having longer color-naming latencies ($M = 79.27$ s) than control cards ($M = 66.29$ s). The three-way interaction also was significant, $F(1, 57) = 19.17$, $p < .01$. Tests for simple main effects and Duncan tests for repeated measures revealed that secure people took longer time to name the colors of self-relevant words, either positive or negative, than those of control words, $F(3, 57) = 28.58$, $p < .01$. Avoidant people took longer time to name the colors of self-relevant positive words than those of other word categories, $F(3, 57) = 18.30$, $p < .01$. Anxious-ambivalent people took longer time to name the colors of self-relevant negative words than those of other word categories, $F(3, 57) = 10.94$, $p < .01$.

In addition, anxious-ambivalent and secure people showed longer latencies in the self-relevant negative card than did avoidant people, $F(2, 57) = 8.51$, $p < .01$. Avoidant people showed longer latencies in the self-relevant positive card than secure people, who, in turn, showed longer latencies than anxious-ambivalent people, $F(2, 57) = 19.90$, $p < .01$. No significant group difference was found in the control cards.

The results strengthen the conclusions of Study 1. The negative self-view of ambivalent participants was manifested in the interference produced by negative self-attributes, whereas the positive self-view of avoidant participants was manifested in the interference produced by positive self-attributes. Interestingly, though secure people described themselves in more positive than negative terms (Study 1), both types of self-attributes appear to be accessible in their self-structure and to interfere with color-naming. That is, these people may incorporate into their self-schema both positive and negative traits, but the overt description of themselves is biased by some self-presentation ten-

⁴ Before ending the experiment, participants were asked to recognize any of the words that they thought had appeared on the cards from a list of target and distraction words (Mathews & MacLeod, 1985). No significant difference was found in the accuracy of recognition among attachment groups. This finding implies that the observed differences in color-naming latencies were not associated with differences in awareness of word content and recognition memory.

dencies. Of course, the findings tell nothing about the mechanism of the interference effect. They only suggest that attachment groups differ in the type of attributes that are active in self-structure.

Study 3

Study 3 examined differences among attachment groups in two aspects of the organization of the self-structure: cognitive differentiation and the pervasiveness of affect. For this purpose, participants completed a trait-sort task (Linville, 1985; Pietromonaco, 1985) in which they were asked to sort positive, negative, and neutral traits into categories that described different aspects of themselves. Then participants were asked to supply a label that described the content or meaning of each of the categories. The number and distinctiveness of the categories created served as measures of self-differentiation, whereas the labels provided for these categories tapped whether the categorization was made on the basis of affective or nonaffective criteria. I predicted that anxious-ambivalent people would show lower self-differentiation scores and provide more affective labels for their self-representations than would secure and avoidant people.

Method

Participants. Eighty high school students (51 females and 29 males ranging in age from 15 to 17) participated in the study without any reward.

Materials and procedure. Participants were individually invited to participate in a study on self-perception. They completed the attachment style scale (see Study 1) and a trait-sort task in a random order. Sixty-three percent of the participants classified themselves as secure ($N = 50$), 20% as avoidant ($N = 16$), and 17% as ambivalent ($N = 14$).

In the trait-sort task, participants received a packet of 88 randomly ordered cards, each containing the name of a trait drawn from Anderson's (1968) list of personality trait adjectives and translated into Hebrew by Himelfarb (1970). The positivity or negativity of the traits was determined by Israeli norms of Anderson's likability ratings (Himelfarb, 1970). Thirty-three traits with likability ratings of less than 257 (e.g., *worried*), 33 traits with likability ratings of greater than 311 (e.g., *generous*), and 22 traits with ratings between 257 and 311 (e.g., *talkative*) were classified as negative, positive, and neutral, respectively.

Participants received the cards and were asked to think about themselves and "to sort those traits that are descriptive of you into groups according to which traits you think belong together." Participants were told that traits could be sorted on any meaningful basis and that each group might represent a different aspect of the self. They were also told that they could form as many or as few groups as they found meaningful, that a trait could be placed in more than one group, and that they did not have to use every trait. After completing the sorting task, participants were asked to give a name to each group of traits ("label the particular aspect of yourself represented by each group").

Results and Discussion

Self-differentiation. Two differentiation scores were computed for each participant: (a) the number of self-aspects (categories) that participants differentiated in describing themselves, and (b) the degree of distinctiveness of the above self-aspects—the mean proportion of attributes that were exclu-

sively sorted in a self-aspect (and not in the others) from the total number of attributes sorted in that aspect. Higher scores indicate higher differentiation and higher distinctiveness of self-aspects.

One-way ANOVAs yielded significant effects of attachment style on the number of self-aspects, $F(2, 77) = 6.13, p < .01$, and on the distinctiveness score, $F(2, 77) = 9.41, p < .01$. As expected, Scheffé tests indicated that anxious-ambivalent participants sorted self-attributes into fewer self-aspects than avoidant participants (see means in Table 2). The secure group did not significantly differ from the other two groups. Accordingly, these tests also revealed that anxious-ambivalent participants constructed fewer differentiated categories than avoidant and secure participants. No significant difference was found between avoidant and secure participants.

Pervasiveness of affect. The labels of the categories were content-analyzed by two judges (graduate psychology students) who were unaware of the attachment style of the participants. Judges read each label and coded it as expressing either positive affect ("traits I like about myself"), negative affect ("my bad qualities"), mixed affect ("my strengths and weaknesses"), or nonaffective themes ("my academic aptitudes"). This procedure was similar to that used by Pietromonaco (1985). The judges agreed in more than 95% of the cases. When a mismatch was found, I decided about the type of the label.

The proportion of each type of label to the total number of categories formed was analyzed with one-way ANOVAs for attachment style (see means in Table 2). Attachment style had significant effects only on the proportions of negative affect labels, $F(2, 77) = 4.78, p < .05$, and nonaffective labels, $F(2, 77) = 4.17, p < .05$. Scheffé tests indicated that anxious-ambivalent participants used fewer nonaffective themes and more negative affect themes than did secure and avoidant participants.

The findings were in line with our predictions. The self-structure of anxious-ambivalent people was found to be pervaded by negative affective experience, which, in turn, may explain their tendency to organize self-relevant information into few, overlapping categories. In contrast, secure and avoidant people were found to diversify the criteria for organizing self-relevant information, which, in turn, may be one of the precursors of their highly differentiated self-structure. Note that it is not yet known whether attachment groups differ in the mechanism and meaning of the differentiation process.⁵

Study 4

Study 4 examined whether attachment groups differ in the integration of self-structure. Participants were asked to think about two different self-aspects (e.g., "I as a student," "I as a friend") and to list a number of distinctive traits for each of them. Scores of integration were obtained by asking participants to rate the similarity, mutual influence, trade-off, and joint interaction between traits of different self-aspects. These

⁵ Similar results were found when the ANOVA was performed on the H score (Linville, 1985)—a score that reflects the minimal number of independent attributes needed to reproduce the trait sort.

Table 2
Means and SDs of Number, Distinctiveness, and Labels of Self-Aspects According to Attachment Style (Study 3)

Sort task measures	Attachment style					
	Secure		Avoidant		Ambivalent	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Differentiation scores						
Number	3.07	1.44	3.69	1.30	2.64 ^a	0.83
Distinctiveness	60.68	11.88	67.70	10.64	49.93 ^{a,b}	9.39
Proportions of labels						
Positive affect	0.16	0.21	0.14	0.16	0.20	0.21
Negative affect	0.11	0.19	0.12	0.15	0.31 ^{a,b}	0.30
Mixed affect	0.08	0.15	0.04	0.13	0.15	0.29
Nonaffective	0.65	0.38	0.70	0.31	0.34 ^{a,b}	0.40

^a Significantly different from avoidant participants.

^b Significantly different from secure participants.

ratings have been regarded in previous studies as representing the main dimensions of cognitive integration (e.g., Tetlock, 1983; Woike, 1994; Woike & Aronoff, 1992). The main prediction was that secure participants would show higher integration scores than would avoidant and ambivalent participants.

Method

Participants. Sixty high school students (32 females and 38 males ranging in age from 16 to 18) participated in the study without any reward.

Materials and procedure. Participants were tested individually on two occasions. In the first session, a large sample of 167 participants completed the attachment style scale (see Study 1). Sixty-one percent of the participants classified themselves as secure ($N = 98$), 25% as avoidant ($N = 46$), and 14% as ambivalent ($N = 23$).

In the second session, 1 week later, 60 participants—20 secure, 20 avoidant, and 20 ambivalent—were randomly selected (within each group) to complete a number of self-referent judgments. Participants were asked to choose two very different aspects of their personal experience and to think about themselves in each of these aspects. Then they wrote, in a free format, five traits for each of the two self-aspects. Participants were told that traits should characterize one of the chosen self-aspects and should not appear in the other aspect. That is, they should be distinctive features of a self-aspect.

After listing the 10 traits, participants rated, on a 7-point scale that ranged from *not at all* (1) to *very much* (7), the extent to which a trait that defines one self-aspect is likely to appear in the other aspect. These 10 ratings served as a manipulation check of the differentiation between the two self-aspects. All the ratings were lower than 3, implying that the integration ratings described below were made on differentiated self-aspects. Moreover, no significant difference was found among attachment groups on these scores.

Participants then received 5×5 matrices; each dimension included the traits of one self-aspect. In the horizontal dimension, participants wrote the traits of the first chosen self-aspect (*A*). In the vertical dimension, participants wrote the traits of the second self-aspect (*B*). Then they made the following randomly ordered ratings on 7-point scales, ranging from *not at all* (1) to *very much* (7):

1. The extent to which a pair of traits from different self-aspects have similar manifestations in overt behaviors. On the basis of their appropriate internal consistency (Cronbach's $\alpha = .92$), the 25 ratings were averaged into a global score labeled *similarity*.

2. The extent to which changes in a trait of one self-aspect (e.g., being more responsible) can produce similar changes in a trait of the other self-aspect (e.g., being more sociable). Participants rated all 25 pairs of traits twice. They first rated the causal influence of traits of self-aspect *A* and then rated the influence of traits of self-aspect *B*. Having appropriate internal consistency (Cronbach's $\alpha = .84$), the 50 ratings were averaged into a global score labeled *mutual influence*.

3. The extent to which a positive change in a trait of one self-aspect would cause a negative change in a trait of the other self-aspect (e.g., being more responsible as a student at the cost of being less sociable as a friend). Participants rated all the pairs of traits twice: for positive changes of traits of self-aspect *A* and for positive changes of traits of self-aspect *B*. On the basis of their appropriate internal consistency (Cronbach's $\alpha = .82$), the 50 ratings were averaged into a global score labeled *trade-offs*.

4. The extent to which a trait of one self-aspect interacts with a trait of the other self-aspect in determining behavior. Participants rated all the pairs of traits twice: for behaviors that were related to self-aspect *A* and for behaviors that were related to self-aspect *B*. The 50 ratings had high internal consistency (Cronbach's $\alpha = .93$) and thus were averaged into a global score labeled *joint interaction*.

The mutual influence, trade-off, and joint interaction scores were highly correlated (r s ranging from .53 to .68). The correlations of the similarity score with the other three scores were lower but also statistically significant (r s ranging from .24 to .29). With the exception of the similarity score, it seems that the other three scores represent related dimensions of self-integration.

Results and Discussion

As can be seen in Table 3, the multivariate ANOVA revealed a significant effect of attachment style, $F(8, 108) = 2.51, p < .05$. This effect was significant in the mutual influence, trade-off, and joint interaction scores (see F ratios in Table 3). Scheffé tests indicated that secure participants reported higher mutual influence, trade-offs, and joint interactions between the two differentiated self-aspects than did avoidant and ambivalent participants (see means in Table 3). Significant differences were not found between the two insecure groups.

Table 3
Means, SDs, and *F* Ratios of Self-Integration Scores According to Attachment Style (Study 4)

Integration score	Attachment style			<i>F</i> (2, 57)
	Secure	Avoidant	Ambivalent	
Similarity				2.44
<i>M</i>	2.96	2.93	2.75	
<i>SD</i>	0.37	0.22	0.38	
Mutual influence				5.16**
<i>M</i>	3.66	3.19 ^a	3.21 ^a	
<i>SD</i>	0.47	0.58	0.50	
Trade-off				5.49**
<i>M</i>	3.69	3.26 ^a	3.24 ^a	
<i>SD</i>	0.34	0.54	0.53	
Joint interaction				7.61**
<i>M</i>	3.94	3.16 ^a	3.13 ^a	
<i>SD</i>	0.63	0.88	0.68	
MANOVA (8, 108)				2.51*

Note. MANOVA = multivariate analysis of variance.

^a Significantly different from secure participants.

* $p < .05$. ** $p < .01$.

Taken together, the findings of Studies 3 and 4 reveal that secure people have a highly differentiated and integrated self-structure, avoidant people have a differentiated but less well-integrated structure, and anxious-ambivalent people have a less differentiated structure. Of course, these findings may reflect broader differences in cognitive organization or skills. Moreover, they should be subject to the influence of response strategies or set. Further research should attempt to deal with these issues and to replicate the current findings using other techniques, such as thematic analysis of personal narrative (Tetlock, 1983; Woike, 1994).

Study 5

Study 5 examined differences among attachment groups in the levels of discrepancies among three domains of the self-structure: actual self, ideal self, and ought self (Higgins, 1987). For this purpose, participants completed the Selves Questionnaire (Higgins et al., 1985), in which they listed 10 traits associated with the three assessed self-domains. Then semantic and quantitative discrepancies were calculated between each pair of domains (actual self-ideal self, actual self-ought self, ideal self-ought self). I predicted that ambivalent and avoidant people would show higher self-discrepancy scores than would secure people.

Method

Participants. Eighty high school students (46 females and 34 males ranging in age from 16 to 18) participated in the study without any reward.

Materials and procedure. Participants were approached in the classroom and tested in groups of around 30. They were told that they would participate in a study on self-perception. They completed the attachment style scale (see Study 1) and the Selves Questionnaire in a

random order. Fifty-five percent of the participants classified themselves as secure ($N = 44$), 25% as avoidant ($N = 20$), and 20% as ambivalent ($N = 16$).

In the Selves Questionnaire, participants received three sheets and listed on each 10 attributes that define their actual self, ideal self, or ought self from their own point of view. Higgins's (1982) definitions of each domain were provided at the top of each sheet. Participants were then asked to rate the extent to which they actually, ideally, or ought to possess the attribute, on a scale that ranged from 1 (*a little*) to 4 (*extremely*).

The discrepancy between two domains was quantified on the basis of Higgins et al.'s (1986) procedure. First I counted (a) the number of semantic mismatches—the number of attributes in one domain that had semantic opposites on the other domain, (b) the number of mismatches of extent—the number of synonyms that appeared in two domains and differed in extent by more than one, and (c) the number of matches—the number of synonyms that appeared in two domains and did not differ in extent by more than one. Semantic matches and mismatches were operationalized using a Hebrew dictionary. Then semantic mismatches were given a weight of 2, mismatches of extent and matches were given a weight of 1, the two types of mismatches were summed, and the matches were subtracted from the sum. On this basis, three discrepancy scores were computed (actual-ideal, actual-ought, and ideal-ought), with higher scores reflecting higher self-discrepancies. To test the reliability of this procedure, two raters independently scored 20 randomly selected self-domain pairs. The interrater correlation was .87.

Results and Discussion

A multivariate analysis of variance (MANOVA) yielded a significant effect for attachment style, $F(6, 150) = 4.75$, $p < .01$. One-way ANOVAs indicated that this effect was significant in all the three discrepancy scores (see *F* ratios in Table 4). Scheffé post hoc tests indicated that both avoidant and anxious-ambivalent participants reported higher self-discrepancies than did secure participants (see means in Table 4). No significant difference was found between avoidant and anxious-ambivalent participants. As expected, secure people showed fewer discrepancies between their actual self and the two representations that serve as motivational guides—ideal self and actual self—than insecure participants.

It is interesting to note that the relatively high ideal-ought discrepancy exhibited by avoidant and anxious-ambivalent people might reflect the existence of a double approach-avoidance conflict (Van Hook & Higgins, 1988), in which meeting one self-guide implies the failure to meet another self-guide. Moreover, this discrepancy may be related to feelings of uncertainty and confusion about personal identity as well as to the internalization of inconsistent or even contradictory parental demands and guides. Further research should explore the attachment-related developmental source of self-guide-self-guide discrepancies.

Study 6

Though no ad hoc predictions can be made about differences between attachment groups in discrepancies between standpoints of the self, this issue can shed light on the way people differing in attachment style internalize reactions of significant others to them. Moreover, it could provide complementary in-

Table 4
Means, SDs, and *F* Ratios of Self-Discrepancy Scores According to Attachment Style (Study 5)

Self-discrepancy scores	Attachment style			<i>F</i> (2, 77)
	Secure	Avoidant	Ambivalent	
Actual self–ideal self				6.42**
<i>M</i>	–1.18	0.95 ^a	1.31 ^a	
<i>SD</i>	2.48	3.19	3.40	
Actual self–ought self				11.80**
<i>M</i>	–1.34	2.20 ^a	2.19 ^a	
<i>SD</i>	3.85	2.50	4.13	
Ideal self–ought self				7.65**
<i>M</i>	–0.97	1.10 ^a	2.31 ^a	
<i>SD</i>	2.81	3.17	3.81	
MANOVA (6, 150)				4.75**

Note. MANOVA = multivariate analysis of variance.

^a Significantly different from secure participants.

** $p < .01$.

formation about the coherence of the self-structure of the three attachment groups. For these reasons, Study 6 explored the association of attachment style with the level of discrepancy between participants' own view of the actual self and participants' perception of the standpoint of three significant others—mother, father, and friend—about the actual self. Participants completed the Selves Questionnaire in reference to the above four standpoints, and relevant discrepancies were calculated.

Method

Participants. Eighty-four high school students (53 females and 31 males ranging in age from 16 to 18) volunteered to participate in the study without any reward.

Materials and procedure. The instructions, material, and procedure were identical to those described in Study 5. For the mother, father, and friend questionnaires, participants were instructed to think about the way their mother/father/friend perceives his or her actual self. The order of the questionnaires was counterbalanced. In the attachment style scale, 61% of the participants classified themselves as secure ($N = 51$), 25% as avoidant ($N = 21$), and 14% as ambivalent ($N = 12$). On the basis of participants' answers to the Selves Questionnaires, three discrepancy scores were computed for each participant: one's own–mother standpoints, one's own–father standpoints, one's own–friend standpoints. Higher scores reflect higher discrepancy between two standpoints.

Results and Discussion

The MANOVA yielded a significant effect for attachment style, $F(6, 158) = 5.93, p < .01$. One-way ANOVAs indicated that this effect was significant in all the three discrepancy scores (see *F* ratios in Table 5). Scheffé tests showed that avoidant and anxious–ambivalent participants reported higher discrepancies between their own standpoint and other's standpoint than secure participants (see means in Table 5). No significant difference was found between avoidant and ambivalent participants.

In the next step of analysis, the quality of the above discrepancies was assessed. That is, whether a mismatch reflects the

belief that a significant other's view of the participant's self is more positive than the participant's own self-view or the belief that a significant other has a more negative view. Two judges (psychology students), unaware of the participants' attachment styles, independently read the traits listed by the participants in each standpoint and marked whether they were positive, negative, or neutral. Judges agreed in more than 90% of the cases. In cases of disagreement, the attribute was marked as neutral. Next, a positivity score was computed for each standpoint by subtracting the number of negative attributes from the number of positive attributes listed in the particular standpoint. Higher scores reflect a more positive image of the actual self. Because the main interest was the discrepancy between the participant's view and the standpoint of others, the scores of mother, father, and friend standpoints were averaged.

A two-way ANOVA for attachment style and standpoint on the self (participant's own, other), with the last variable treated as a within-subject measure, yielded a significant interaction, $F(2, 81) = 8.59, p < .01$. Simple main effect tests for repeated measures revealed the following differences: For ambivalent participants, their own perspective of the self was less positive than the perceived standpoint of significant others, $F(1, 81) = 5.73, p < .05$ ($M_s = 1.75$ vs. 2.78). In contrast, for avoidant participants, their own view of the self was more positive than the perceived standpoint of significant others, $F(1, 81) = 8.08, p < .01$ ($M_s = 2.86$ vs. 1.84). No significant difference was found in the secure group ($M_s = 2.53$ vs. 2.49).

Relative to secure people, both avoidant and anxious–ambivalent people have more discrepancies between their own self-view and the view they believe that a significant other has of them. However, the insecure groups differed in the quality of this discrepancy: Whereas avoidant people believed that a significant other has a more negative view of themselves, anxious–ambivalent people believed that a significant other has a more positive view.

Taken as a whole, the findings of Studies 5 and 6 indicate that secure people have a more coherent self-structure than do

Table 5
Means, SDs, and F Ratios of Self-Discrepancy Scores According to Attachment Style (Study 6)

Discrepancy between standpoints	Attachment style			<i>F</i> (2, 81)
	Secure	Avoidant	Ambivalent	
Participant's own-mother standpoint				7.82**
<i>M</i>	-1.20	2.09 ^a	3.08 ^a	
<i>SD</i>	3.78	5.15	3.96	
Participant's own-father standpoint				9.28**
<i>M</i>	-2.00	1.01 ^a	2.33 ^a	
<i>SD</i>	2.88	5.51	2.96	
Participant's own-friend standpoint				17.54**
<i>M</i>	-1.11	2.19 ^a	4.75 ^a	
<i>SD</i>	2.57	4.49	4.41	
MANOVA (6, 158)				5.92**

Note. MANOVA = multivariate analysis of variance.

^a Significantly different from secure participants.

** $p < .01$.

insecure people. However, one should take into account that these findings were based on global descriptions of the self. Further research should ask participants to describe the domains and standpoints of more specific self-aspects and evaluate whether the observed differences are generalized over different self-aspects or circumscribed to attachment-related self-aspects (e.g., "myself as a friend").

General Discussion

Taken as a whole, the current findings support the hypothesized associations between attachment style and the content and structure of self-representations. The findings also highlight the need for assessing different aspects of the self-structure rather than the global concept of self-esteem. In fact, attachment groups differed not only in the positivity of their self-view but also in other structural dimensions of the self.

The findings for secure people emphasize the importance of a warm attachment relationship for the development of a positive, coherent, and well-organized self-structure. These people described themselves in positive terms yet admitted negative self-attributes (Studies 1 and 2), exhibited a highly differentiated and integrated self-schema (Studies 3 and 4), and revealed relatively low discrepancies between domains and standpoints of the self (Studies 5 and 6). This pattern may follow from the secure base of accepting and supporting attachment figures, which may lead to the creation of a balanced self-view by highlighting positive self-representations and encouraging people to tolerate weak points of the self. Moreover, it may lead to a coherent self-structure by promoting a self-view that meets internalized guides and matches the positive view that secure people believe others have of them.

The observed self-schemas of secure people concurs with a growing body of research connecting security in attachment to constructive coping (e.g., Mikulincer et al., 1993). The positive view secure people have of themselves may allow them to confront life problems with optimism and a sense of mastery, whereas their ability to organize experience into differentiated,

nonaffective categories may allow them to encapsulate distress and to prevent its spreading to the entire self-structure. In addition, the capacity of secure people to explore both strong and weak points of the self may be manifested in setting realistic goals and plans, and flexible adjustment of schemata and actions to reality constraints. Finally, the coherence of their self-structure may prevent the experience of overwhelming distress every time they fail in meeting their ideal-ought standards.

Although some authors have claimed that the self-view of avoidant people resembles that of secure people (Bartholomew & Horowitz, 1991), the current findings present a more complex picture. On the one hand, avoidant people were similar to secure people in that they had a highly positive and differentiated self-structure that was not pervaded by emotional experience (Studies 1 and 3). On the other hand, avoidant people differed from secure people in that they showed low accessibility to negative self-aspects, did not perceive connections and interactions between differentiated self-aspects, and revealed high discrepancies between domains and standpoints of the self (Studies 2, 4, and 6). In general, the positive self-view of avoidant people appears to lack balance, integration, and inner coherence.

The above pattern of self-representations may result from both the basic insecurity of avoidant people and their habitual way of coping with it. Their basic insecurity was manifested in the relatively high discrepancies between domains and standpoints of the self. Their history of an insecure relationship with rejecting parents (e.g., Shaver & Hazan, 1993) may lead avoidant people to believe that they are not the type of person their parents think they ought to be or the person for whom their parents had hoped. The internalization of this sense of failure may be reflected in (a) the development of standards that are so far from what one actually is that they cannot be met without destroying core aspects of the self and (b) the belief that significant others have a negative view of one's self.

The strategy avoidant people typically use in coping with their basic insecurity was directly manifested in the low accessi-

bility of negative self-attributes and the inability to integrate different aspects of the self. Mikulincer and Orbach (1995) labeled this strategy *nondifferentiated defensiveness*. It includes denial of insecurity, devaluation of events that cause painful feelings, and suppression of negative affects and memories. In the current study, this strategy might underlie the development of a nonintegrated self-structure, in which some important aspects of personal experience are suppressed and precluded from awareness.

Along the above reasoning, the greater accessibility of positive self-attributes exhibited by avoidant people might not imply the existence of truly high self-esteem. Rather, it may imply that their self-esteem is so low and fragile that they cannot tolerate discovery of the slightest flaw. This idealization of the self seems to be a defense against the experience of rejection by others on the recognition of one's imperfections. Accordingly, the high self-differentiation of avoidant people might in part reflect the action of repression, by which information that is not accepted as part of the self is dissociated from other positive self-aspects. This line of thinking emphasizes the need for more subtle measures of self-representation that could bypass the defensive armor of avoidant people and reveal their basic sense of rejection and worthlessness.

If this reasoning is true, one can ask why this strategy was not manifested in avoidant participants' self-discrepancies. This may be due to methodological reasons. In the Selves Questionnaire, participants were not asked to recognize or admit self-discrepancies but only to list traits of various self-domains and standpoints. Discrepancies were calculated by external judges. Asking avoidant participants directly about their perceived level of self-discrepancies might have activated their habitual defensive strategies, therefore resulting in the negation of any self-discrepancy.

Anxious-ambivalent participants exhibited a negative, simple, and less integrated self-structure. Their self-structure was pervaded by negative self-attributes and affects (Studies 1–3), and it was characterized by low differentiation and low integration of self-representations (Studies 3 and 4) as well as by high discrepancies between domains and standpoints of the self (Studies 5 and 6). This pattern of findings appears to reflect the basic attachment insecurity of anxious-ambivalent people and their difficulties in regulating the resulting distress. Their experience of rejection and nonacceptance by attachment figures is directly manifested in the internalization of a negative self-image that is far from what they want or feel they ought to be as well as from what they believe significant others expect from them. Their difficulty in regulating distress was manifested in the high accessibility of negative self-attributes and the excessive use of affective criteria in organizing self-relevant information. Anxious-ambivalent people may feel overwhelmed by negative thoughts and feelings and then may lack the resources needed for developing a complex and coherent self-structure.

It is important to note that the pattern of findings for anxious-ambivalent participants parallels that of depressed people found in previous studies (e.g., Higgins, 1987; Kuiper & Derry, 1982; Pietromonaco, 1985). This parallelism is supported by prior findings that anxious-ambivalent people are likely to experience depressed mood (Mikulincer et al., 1993). Further

studies should examine whether there are any aspects of self-structure that are associated specifically with anxious-ambivalent attachment and not necessarily with depression.

The current findings appear to support Bartholomew and Horowitz's (1991) idea that the model of the self is a fundamental dimension of the individual's attachment style. However, the findings present a more complex picture than that implied by a positive-negative dichotomy of the self (Bartholomew & Horowitz, 1991). For example, the positive view that secure people have of themselves seems to live together with the fact that negative self-attributes are active components of their self-structure. Moreover, although secure people have accessible bad attributes, they show low self-discrepancies. In contrast, avoidant people, who admit only positive attributes, show high self-discrepancies that reflect a sense of failure in meeting self-guides and inner conflicts with internalized representations of attachment figures. Clearly, the findings demand a more complex conceptualization of models of the self related to attachment styles.

Future conceptualizations of working models of the self should also take into account that they mirror representations of attachment experiences. The self-view of secure people mentally reproduces their positive attachment experiences, wherein they could tolerate distress, separation, and other negative episodes because of their confidence in the availability of loving attachment figures. The incoherent self-view of avoidant people may be a natural continuation of the dissociative process that excludes information related to attachment needs and negative attachment experiences. Finally, the negative self-image of anxious-ambivalent people mirrors their negative attachment experiences wherein they feel that they bring about only negative outcomes and are unable to prevent the loss of positive outcomes.

Some methodological caveats should be considered in discussing the current findings. First, the sample included young adolescents who probably had limited experience in romantic relationships and who may show exaggerated worries about self-presentation and other self-identity issues. Further studies should attempt to replicate the current findings in older samples. Second, the cross-sectional design of the studies prevents making any statement about the direction of effects and about the mechanisms that underlie the connection between attachment style and self-structure. Although Bowlby (1973) proposed that attachment experiences shape self-image, it might be that the reverse is the case or that other factors shape both attachment style and self-image. Third, the present studies bring no information about concrete, behavioral-based self-representations as well as about concrete patterns of interactions with specific attachment figures. Fourth, further studies should pay more attention to the measurement of attachment working models, including parent-child attachment, and to alternative taxonomies of attachment style.

Beyond the above caveats, the present series of studies makes a number of important contributions to the research on adult attachment. It illustrates the importance of an attachment analysis to understand people's self-views and the way they organize self-relevant information. The findings also provide empirical support for Bowlby's (1973) notion that people incorporate at-

tachment experiences into working models of the self and carry these models into new experiences.

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Received November 21, 1994

Revision received April 14, 1995

Accepted April 25, 1995 ■



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On the Role of the Implicit Self-Concept in Adult Attachment

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Abstract. We report a study that was designed to investigate attachment-related differences in the implicit self-concept and to evaluate the psychometric properties of the Implicit Association Test (IAT) in the context of attachment research. Two variants of the IAT were used to assess implicit relational self-esteem and relational anxiety after stress induction. Results showed that both the relational self-esteem and relational anxiety IAT (1) were meaningfully related to individual differences in attachment style and (2) predicted cognitive and affective reactions to attachment-related distress in addition to and beyond self-report measures of attachment. The results provide evidence for the reliability and validity of the IAT as an index of the implicit attachment self-concept.

Keywords: adult attachment, self-concept, Implicit Association Test (IAT)

Introduction

As is illustrated by the creation of this special issue, implicit measures of psychological constructs constitute one of the most important and exciting developments in recent research on psychological assessment. Implicit measures can be defined as the outcomes of measurement procedures that reflect the to-be-measured construct in an automatic manner (e.g., De Houwer & Moors, 2007). When the constructs of interest are aspects of personality, implicit measures thus attempt to capture the automatic impact that personality can have on behavior. Research has shown that implicit measures of personality can be related in a meaningful manner to actual behavior and often allow one to predict behavioral responses above and beyond what can be predicted on the basis of self-report measures (e.g., Asendorpf, Banse, & Mücke, 2002; Schnabel, Banse, & Asendorpf, 2006). In the present article, we explore the usefulness of implicit measures in the context of adult attachment. Given that automatic processes are assumed to play a crucial role in attachment behavior, implicit measures could provide a particularly useful contribution to research on this topic. As such, adult attachment represents an ideal subject to further explore the value of implicit measures in the assessment of individual differences.

One of the most prominent ideas of Bowlby's (1969, 1982) attachment theory is that early attachment experiences are internalized into mental representations of the self and others that coordinate cognition, affect, and behavior in close relationships. These representations are also called internal working models (IWM) and are thought to be core features of personality and the foundation of individual differences in attachment styles. Such individual differences can be organized within a two-dimensional space anchored

by the models of self and others, which, in combination, yield four prototypic attachment styles: secure (positive self and positive other), preoccupied (negative self and positive other), dismissive (positive self, negative other), and fearful (negative self, negative other) (Griffin & Bartholomew, 1994). More recently, an emotional and behavioral regulation interpretation of the two underlying dimensions has been recommended, reframing individual differences in terms of anxiety and avoidance (Brennan, Clark, & Shaver, 1998). These dimensions theoretically map onto the models of self and others, respectively. Integrating both frameworks, it has been assumed that attachment anxiety is associated with negative beliefs about the self and others, whereas attachment avoidance would be characterized by positive self-views and negative expectations about others.

Given the broader social-cognitive interest in the self-concept, the present study focused specifically on attachment-related differences in self-representations rather than other-representations. Evidence from self-report studies is largely consistent with the theoretical assumptions that attachment security is related to more positive beliefs about the self, whereas attachment anxiety is associated with lower self-esteem. With regard to attachment avoidance, findings are less coherent, with the majority of studies reporting negative or nonsignificant relationships between avoidance and global self-esteem (for a review, see Mikulincer & Shaver, 2007). This absence of an association could be related to the fact that self-report measures can reveal only partial information about the attachment self-model because such measures are limited to the study of explicit, introspectively accessible representations of the self-concept. This is an important restriction given that many aspects of attachment working models are assumed to operate in an automatic mode (Mikulincer & Shaver, 2003), which calls for the use of more implicit measurement procedures in the context of attachment.

Since working models have been conceptualized as cognitive-affective schemas (Baldwin, 1992), attachment researchers have started to rely on social-cognitive reaction-time methods for investigating the accessibility and organization of self-representations. For example, using a Stroop color-naming task and a self-description task with positive and negative self-relevant and self-irrelevant words, it has been demonstrated that secure people show access to both positive and negative self-relevant traits. Anxious individuals, on the other hand, were found to display heightened accessibility of negative self-traits, whereas avoidant individuals had better access to positive self-traits (e.g., Mikulincer, 1995, 1998). In a related study, Mikulincer, Dolev, and Shaver (2004) also showed that the induction of a cognitive load following the imagination of a painful relationship breakup heightened avoidant individuals' access to negative self-traits, as was indicated by longer color-naming latencies on negative self-relevant words in a Stroop task. In the nonload condition, attachment avoidance was related to lower accessibility of negative self-traits and heightened accessibility of positive self-traits. These results suggest that avoidant individuals tend to inflate their self-image by suppressing negative self-attributes. Accordingly, their self-esteem should not be regarded as authentically positive, but rather as unstable and defensive in nature.

In another interesting study focusing on implicit self- and other-beliefs in the context of attachment, Zayas and Shoda (2005) used an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) for measuring automatic evaluative associations regarding the self and a significant other. Their study revealed that scores on a Partner IAT (using the categories *partner*, *not-partner* and *pleasant*, *unpleasant*) were related to explicit measures of adult attachment styles, whereas a Self IAT (using the categories *me*, *not-me* and *pleasant*, *unpleasant*) was not related to attachment orientation. The latter null finding is intriguing because, as outlined above, automatic evaluations of the self are assumed to be crucial determinants of individual differences in attachment. We, therefore, decided to conduct a study to further explore the role of the implicit self-concept in the context of adult attachment. Drawing on the original assumptions of attachment theory, we tried to optimize our chances of finding the hypothesized relations between attachment styles and IAT measures of the self-model by changing the experimental design used by Zayas and Shoda in three ways.

First, we changed the IAT to measure relational self-esteem rather than global self-esteem. This change follows naturally from the core idea in attachment theory that the model of self is construed and embedded in relational experiences with significant others. Whereas global self-esteem is contingent on different domains (e.g., academic, physical, social) and entails a general positive or negative evaluation of the self in relative isolation, the "relational self" reflects the extent to which one values the self as worthy or unworthy of love in relation to a specific attachment

figure. In line with Zayas and Shoda (2005), we assessed attachment style with respect to one specific attachment figure because the self-model is likely to differ as a function of the specific attachment relationship (see Pietromonaco & Feldman Barrett, 2000).

Second, the lack of association between the Self IAT and attachment style in the Zayas and Shoda study (2005) could be attributed to the fact that automatic self-evaluations were measured in a relatively neutral and stress-free context. This is potentially problematic because attachment theory clearly emphasizes the role of working models in regulating proximity and felt security when confronted with distress (Collins, Guichard, Ford, & Feeney, 2004). This would imply that a challenge to the attachment system is required to activate the self-concept and, hence, to observe the expected attachment-related differences in implicit beliefs and attitudes regarding the self. We, therefore, induced a distress context before administering the IAT by means of a procedure in which participants were asked to imagine their attachment figure going abroad for a long period of time. In relation to this, research has shown that disruptions of proximity to the attachment figure (e.g., separation), whether real or imagined, are important sources of distress that trigger the operation of attachment processes (Feeney & Kirkpatrick, 1996; Fraley & Shaver, 1997).

Third, in order to obtain a full understanding of the attachment self-concept, it is important to go beyond the study of self-esteem, which is just one aspect of the self, and to explore other attributes that could be part of one's self-concept. This fits with the general definition of the self-concept by Greenwald et al. (2002), who define the self as a cognitive structure that contains all associations of the concept "self" with attribute concepts that are characteristic of the individual (see also Asendorpf et al., 2002). Given the correspondence between the self-model and the anxiety dimension of attachment, another important aspect of the attachment self-concept could be the extent to which the self is associated with relational anxiety, that is, the fear of being abandoned and rejected by significant others. Therefore, we also included an Anxiety IAT, designed to capture the anxiety component of the relational self-concept.

Based on available theories and evidence (see Mikulincer & Shaver, 2007), we expected that higher scores on attachment anxiety, as measured by the Experiences in Close Relationships Scale-Revised (ECR-R; Fraley, Waller, & Brennan, 2000), would be related to a decrease in implicit relational self-esteem and an increase in relational anxiety as measured by the IAT. For attachment avoidance, we expected the opposite, namely a higher level of implicit self-esteem and a lower level of relational anxiety. With regard to the four-group approach, measured by the Relationships Questionnaire (RQ; Griffin & Bartholomew, 1994), we predicted that the attachment styles with a positive self-model (i.e., secure and dismissive) would be related to an increase in implicit self-esteem and a decrease in implicit relational anxiety, whereas the attachment styles with a negative self-model (i.e., preoccupied and fearful)

should show the opposite pattern of correlations. On the other hand, because avoidant individuals have been shown to defensively suppress negative self-traits and feelings of rejection and anxiety (Mikulincer et al., 2004), it can also be expected that higher scores on the ECR avoidance and the dismissing item of the RQ will be related to a more negative implicit self-concept as measured by the IAT.

Although we expect to find meaningful correlations between the IAT and questionnaire scores, it could also be that the correlations will be low to moderate because both types of measures are believed to tap related, though different aspects of a specific construct (Hofmann, Gawronski, Gschwendtner, Le, & Schmitt, 2005). We, therefore, added other criteria to assess the validity of the measures. Most importantly, we registered the thoughts and feelings that participants reported spontaneously in response to the hypothetical separation scenario and related these to the questionnaire and IAT measures. We did this because separation experiences are assumed to have important implications for one's self-concept in terms of feeling unworthy and rejected (Bowlby, 1973; see also Mikulincer et al., 2004). Hence, if we could demonstrate that the IAT measures are related to these thoughts and feelings over and above the traditional questionnaires, this would demonstrate not only the validity of the IAT measures but also their added value in attachment research.

Method

Participants

Sixty-one first year psychology students (42 women, 19 men) at Ghent University participated in return for extra course credit.

Materials and Procedure

Identification of Attachment Figure and Separation Prime

First, each participant's primary attachment figure was identified using the WHOTO scale that consists of six questions referring to the three critical features of an attachment figure (proximity seeking and separation distress, safe haven, and secure base; Hazan & Zeifman, 1994). For each question, participants had to write the name of the person that best served each of these functions. The person that was listed most frequently was labeled as the primary attachment figure. In case of an exaequo, we chose as the attachment figure the person that satisfied the larger number of attachment-related functions (see Fraley & Davis, 1997). Because our sample consisted of adolescents and young adults, the attachment figure was either a partner, a good friend, or a parent. Then, participants were asked to imagine this attachment figure going abroad for 1 to 2 years

and write about thoughts and feelings related to such an event.

Self IAT and Anxiety IAT

Subsequently, the two IATs were administered in a counterbalanced order to control for task-order effects. To minimize error variance, the order of the blocks within each IAT was kept constant for all participants (see Hofmann et al., 2005). Following Greenwald et al. (1998), the IATs consisted of five blocks in which participants had to categorize words as quickly as possible into different categories by pressing a left (Q) or right (M) response-button. The items were presented equally often in a random order. In the first block of the Self IAT, participants discriminated target-items by pressing a right key for *me*-words and a left key for *not-me* words. Next, they sorted attribute-items into *relationally worthy* (right) and *relationally worthless* (left) categories. The third stage combined these attributes and targets so that *me* and *relationally worthy* (right) had to be discriminated from *not-me* and *relationally worthless* (left). In Block 4, the key assignment for *relationally worthy* and *relationally worthless* was reversed. Finally, the two test blocks were repeated with the reversed response assignment (*me* – *relationally worthless* vs. *not-me* – *relationally worthy*). The single-task blocks included 24 trials, whereas the dual-task blocks consisted of two sub-blocks of 48 trials. The procedure for the Anxiety IAT was identical.

As labels for the Self IAT, we used the Dutch words for *me* (items: me, myself, I), *not-me* (items: others, they, them), *relationally worthy* (items: loved, liked, agreeable) and *relationally worthless* (items: inferior, rejected, disagreeable). The stimuli of the Anxiety IAT were identical to those of the Self IAT except that the labels and words of the attribute categories were replaced by *relationally not-anxious* (items: relaxed, certain, surrounded) and *relationally anxious* (items: abandoned, tense, uncertain). Special efforts were made to ensure a good understanding of the category labels so the IAT was preceded by an instruction screen that described the items and labels as referring to one's primary attachment relationship.

Self-Report Questionnaires

Next, participants completed a Dutch translation of the ECR-R (Fraley et al., 2000; ECR-R-NL, Buysse & Dewitte, 2004) and the RQ self-report scales (Griffin & Bartholomew, 1994; RQ-NL, Declercq, Bogaerts, Lievrouw, & Van Poppel, 2003). The ECR-R consists of an anxiety scale (18 items) tapping fear of abandonment and strong desires for interpersonal merger, and an avoidance scale (18 items) assessing discomfort with closeness, dependence, and intimate self-disclosure. The ECR-R has proven to be internally consistent and adequate in terms of construct validity (e.g., Fraley et al., 2000). In the current sam-

ple, Cronbach's α s were high for the anxiety (.89) as well as for the avoidance subscale (.92). The RQ consists of four descriptive paragraphs, each reflecting a different attachment style (secure, preoccupied, dismissive, and fearful). Based on the recommendations by Fraley and Waller (1998), continuous ratings of the four prototypes were used by asking the participants to rate each of the descriptions on a 7-point scale in terms of how well the paragraph describes their relationship with their primary attachment figure.

Finally, the 11 statements of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964) were administered to control for social desirability response bias.

Results

Preliminary Analyses

IAT analyses were conducted with the D600 scoring algorithm recommended by Greenwald, Nosek, and Banaji (2003). The Self IAT score was computed by subtracting the mean latencies of the initial combined tasks from the mean latencies of the reversed combined tasks so that larger positive IAT scores reflected higher implicit relational self-esteem. For reasons of clarity, the Anxiety IAT score was calculated in such a way that larger positive scores reflected higher implicit anxiety. In order to evaluate the internal consistency of the IATs, we divided each combined block into two sub-blocks of equal length (first half and second half) and then calculated difference scores for these two halves. The Spearman-Brown coefficients revealed a good split-half reliability for both the Self IAT (.80) and the Anxiety IAT (.72).¹ Furthermore, a significant positive correlation emerged between the two IAT scores, $r = .26$, $p < .05$.

Coding of the Responses to the Separation Scenario

The participants' spontaneous responses to a hypothetical separation from the attachment figure were coded by a coder who was unaware of the attachment and IAT scores of the participants. Coding reliability was assessed by independent coding of 35 randomly selected participants by another coder.

Based on a first reading of the scenarios, several categories of thoughts and feelings were delineated (e.g., feelings of anxiety, sadness, jealousy, pride, trust, . . .; thoughts about abandonment, infidelity, positive and negative consequences for the relationship, . . .) and the coders counted if and how many times these thoughts and feelings were reported by each participant. For statistical reasons and reasons of clarity, the different categories were aggregated into four main variables of interest: the number of reported negative feelings, positive feelings, negative thoughts, and positive thoughts. Inter-coder reliability was satisfactory for all judgments (Cronbach's α s of .90 for negative feelings, .83 for positive feelings, .92 for negative thoughts, and .85 for positive thoughts).

Correlations Among the IATs and the Attachment Questionnaires

As presented in Table 1, the Self IAT was related significantly to preoccupied attachment as measured by the RQ and attachment anxiety as measured by the ECR². The Anxiety IAT was related only to preoccupied attachment as measured by the RQ. This indicates that the more anxiously attached individuals had less positive implicit self-concepts. No significant relations were found with the other attachment scales.

Regressions

To examine the predictive validity of the IATs, we performed a series of regression analyses with reported positive and negative thoughts and feelings as criterion variables and the IAT and attachment scores as predictors.³ The analyses with the ECR and the RQ were conducted separately and are presented in Table 2. In a first series of regressions, the ECR anxiety and avoidance scores and their interaction term were entered in Step 1 and the Self and Anxiety IAT in Step 2. The regression analysis on reported negative feelings revealed that the ECR attachment scores made a marginally significant contribution in Step 1, $R^2 = .11$, $p < .10$, whereas the Self and Anxiety IAT showed an independent contribution when entered in Step 2, $\Delta R^2 = .12$, $p < .05$. Both avoidant attachment as measured by the ECR and the level of implicit relational self-esteem and anxiety as measured by the IAT predicted feeling less negative about the imagined separation. With regard to the predic-

¹ Given that the primary aim of the present studies was to identify individual differences in the implicit self-concept, we did not counterbalance the order of response assignment in the IATs (see Hofmann et al., 2005). Therefore, the IAT-effects cannot be interpreted in absolute terms. Yet, for the interested reader, we report that participants generally evaluated themselves as being more relationally worthy and less relationally anxious (Cohen's d of 1.16 for the Self IAT and .87 for the Anxiety IAT).

² Because the ECR defines attachment security in terms of low scores on anxiety and avoidance, we also conducted (separate) regression analyses on the Self and Anxiety IAT with attachment anxiety, avoidance, and their interaction term as predictors. The interaction terms between attachment anxiety and avoidance were not significant, $t < 1$.

³ We also explored whether the order of IAT administration (Self IAT – Anxiety IAT vs. Anxiety IAT – Self IAT) would moderate the relationship between the IAT, the attachment scores, and the criterion variables by entering task order and the interaction terms into the regression analyses. Neither the order of administration main term nor the interaction terms were significant, F values < 1 , indicating that the pattern of results was not affected by task order effects.

Table 1. Correlations among all measures

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ECR anxiety		.08	-.34***	.17	.64***	-.11	-.28**	.07	-.00	.21	-.28**	-.08	-.03
2. ECR avoidance			-.50***	.41***	-.13	.53***	.07	-.19	-.33***	.00	-.23	-.08	.11
3. RQ secure				-.55***	-.15	-.33***	.21	-.08	-.14	-.30**	.17	-.08	-.36***
4. RQ fearful					-.09	.20	-.02	-.04	-.00	.14	.02	.10	.20
5. RQ preoccupied						-.15	-.29**	.26**	.20	.19	-.20	.12	-.05
6. RQ dismissive							-.17	.01	-.07	.09	-.18	.12	-.04
7. Self IAT								.26**	-.29**	-.30**	-.01	-.08	-.06
8. Anxiety IAT									.34***	-.21	.05	-.10	.01
9. Neg feelings										.36	.08	.04	-.02
10. Neg thoughts											-.16	-.07	.14
11. Pos feelings												.11	.09
12. Pos thoughts													.11
13. Soc desirability													

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 2. Regressions on cognitive and affective separation responses as a function of self-reported attachment style (ECR and RQ) and Self and Anxiety IAT

Predictors	Negative feelings		Negative thoughts		Positive feelings		Positive thoughts	
	β	t	β	t	β	t	β	t
ECR anxiety	-.06	-.49	.15	1.15	-.28	-2.16**	-.10	-.75
ECR avoidance	-.27	-2.12**	.07	.51	-.22	-1.63	-.04	-.32
ECR anx X avoid	.01	.05	.10	.75	-.01	-.04	.15	1.09
Self IAT	-.22	-1.73*	-.24	-1.74*	-.10	-.70	-.12	-.81
Anxiety IAT	.24	-1.87*	.13	-.99	-.10	-.73	-.11	-.77
RQ secure	-.14	-.86	-.23	-1.45	.16	.98	.06	.33
RQ fearful	-.04	-.28	-.02	-.09	.13	.81	.11	.70
RQ preoccupied	.02	.14	.10	.74	-.24	-1.66	.18	1.24
RQ dismissive	-.14	-1.06	-.01	-.07	-.21	-1.52	.14	.96
Self IAT	-.21	-1.53	-.23	-1.66	-.15	-1.03	-.05	-.38
Anxiety IAT	.27	2.10**	.08	.58	-.01	-.05	-.15	-.11

* $p < .10$, ** $p < .05$, *** $p < .01$.

tion of positive feelings, we found that the attachment scores made a significant contribution in Step 1, $R^2 = .12$, $p = .05$, but the Self and Anxiety IAT did not add significantly to this prediction, $\Delta R^2 = .01$, $p > .10$. Specifically, only a significant main effect of attachment anxiety emerged, indicating that more anxiously attached individuals felt less positive about the imagined separation. The regression analysis on reported negative thoughts revealed no significant effects of the ECR attachment scores, $R^2 = .06$, $p > .10$. There was, however, a marginally significant increment in explained variance from Step 1 to Step 2, $\Delta R^2 = .08$, $p < .10$, indicating that the Self IAT tended to predict fewer negative thoughts about the imagined separation.

The regression analysis on reported positive thoughts revealed no significant effects, p values $> .10$.

Next, the above reported regression analyses were repeated, entering as predictors the RQ secure, fearful, preoccupied, and dismissive scores in Step 1 and the Self and Anxiety IAT in Step 2. These analyses revealed a significant independent contribution of the IAT measures on reported negative feelings, $\Delta R^2 = .13$, $p < .05$. More specifically, we found that the Anxiety IAT significantly predicted more negative feelings about the imagined separation. The RQ attachment scores did not reveal significant effects. The regression analyses on positive feelings, positive thoughts, and negative thoughts showed no significant relations, p values $> .10$.⁴

⁴ Note that when the IAT measures were entered separately into the regression analyses, both the Self and Anxiety IAT significantly predicted the number of reported negative feelings at the .05 level and thus showed both incremental validity above and beyond the ECR and RQ scores.

Social Desirability

In order to control for the influence of self-presentation tendencies on the relation between attachment style, the IATs, and cognitive and affective distress responses, we conducted the same regression analyses as reported above, but entered social desirability in Step 1, the attachment scores in Step 2, and the IATs in Step 3. Controlling for social desirability did not affect the pattern of results in any of the analyses.

Discussion

The results of the present study showed that the levels of implicit relational self-esteem and implicit relational anxiety as measured by the IAT (1) were meaningfully related to individual differences in attachment style as measured by the ECR and RQ and (2) were able to predict attachment-related thoughts and feelings in addition to and beyond self-report measures of attachment. This supports the value of the IAT as a reliable and valid index of the implicit attachment self-concept.

Regarding the relation between individual differences in attachment style and automatic evaluations of the self, our findings showed that attachment anxiety, as measured by the ECR and the RQ (i.e., preoccupied attachment), was associated with lower implicit relational self-esteem and higher implicit relational anxiety. This fits with the theoretical description of anxious individuals as feeling anxious, worthless, weak, and unloved, especially when dealing with distress (Mikulincer & Shaver, 2003). Avoidant attachment, in contrast, showed no significant association with either the self-esteem or the anxiety component of the implicit self-concept. On the one hand, this fits with previous self-report studies revealing inconsistent (i.e., negative to nonsignificant) results regarding the relation between self-esteem and avoidant attachment (see Mikulincer & Shaver, 2007). On the other hand, studies using reaction time measures did suggest a positive self-view in avoidant individuals (Mikulincer, 1995, 1998) and even found that their self-view became negative when a cognitive load was added, which points to the instability of the avoidant self-concept (Mikulincer et al., 2004). Yet, the emphasis of these studies on global positive and negative evaluations of the self impairs an accurate comparison between previous and present results because we specifically focused on the relational self within a particular attachment relationship. In this context, it is also worth noting that avoidant individuals tend to dismiss relational sources of self-esteem. Their self-view is, thus, likely to depend on the specific domain (e.g., achievement, social) in which it is assessed (see Mikulincer & Shaver, 2007). Furthermore, the Mikulincer studies have relied on the emotional Stroop task for measuring implicit self-representations and this task does

not allow drawing conclusions on implicit self-esteem as such, but rather focuses on the *accessibility* of self-relevant traits.

The fact that we used an attachment-related distress prime may also provide a possible explanation for the lack of relationship with attachment avoidance. Previous research has shown that an attachment-related threat such as separation strengthens anxious individuals' self-devaluation in an attempt to elicit compassion and proximity by the attachment figure. The self-view of avoidant individuals, in contrast, was found to be unaffected by relationship threats because they defensively suppress attachment needs as a means to keep their independence and self-control. An ego-oriented threat such as failure, on the other hand, did elicit the expected positive self-view in avoidant individuals (Mikulincer, 1998; Mikulincer & Shaver, 2003). Hence, future research should incorporate both attachment-related and attachment-unrelated threat contexts to examine more accurately the effects of threat on implicit relational self-esteem and anxiety as a function of attachment. With regard to attachment security, it is rather intriguing that no relationship was found between the IAT measures and the secure item of the RQ, especially when considering that secure individuals are known to display a stable positive self-view that is unaffected by the induction of threat (Mikulincer, 1998).

The present study was also concerned with establishing the psychometrics qualities of the IAT for assessing the implicit self-concept in the context of attachment. As is usually the case with IAT measures, split-half reliability was good. In addition, the observed correlations between the IAT and self-report measures of attachment style can be regarded as evidence for the convergent validity of the IAT scores. The fact that the present study did find theoretically meaningful correlations, whereas other studies (e.g., Zayas & Shoda, 2005) did not, could be related to the fact that we induced relational distress and used variants of the IAT that focused on relational self-esteem and relational anxiety, rather than global self-esteem. Also note that the Anxiety IAT was related to explicit reports of attachment anxiety as measured by two independent attachment questionnaires that differ considerably in format, which further supports the idea that both measures are tapping a common underlying psychological construct.

Correlations between self-report and implicit measures are, however, a somewhat ambiguous indicator of the validity of implicit measures. On the one hand, it can be assumed that both types of measures converge in a theoretically meaningful manner because they are believed to tap related constructs. On the other hand, implicit measures are assumed to capture features of the construct that cannot be captured by self-report measures. Also, current views on adult attachment could be incorrect in their predictions about how implicit and self-report measures should be related. We, therefore, also examined whether the IAT measures allowed predicting spontaneous affective and cognitive reactions to an imagined relational threat over and

above what could be predicted on the basis of self-report measures. With respect to the ECR, both IATs added incremental validity over self-reported attachment style in predicting negative feelings reported after the induction of a (hypothetical) threat to the attachment relationship. Also when the RQ scores were entered into the analysis, the IAT measures, especially the Anxiety IAT, made a unique contribution to the prediction of negative feelings, whereas self-reported attachment style did not. In addition, the Self IAT was the only variable that could predict negative thoughts in response to an imagined separation. More specifically, we found that lower implicit relational self-esteem was related to a higher number of reported negative thoughts and feelings, whereas higher implicit relational anxiety was associated with reporting more negative feelings. This fits with theoretical predictions.⁵ The fact that the IAT measures had incremental predictive validity in relation to self-report measures of attachment supports the validity of these implicit measures. It also underlines the importance of supplementing traditional self-report questionnaires with indirect measures of self-evaluations that are able to capture automatic cognitive-affective components of the self-concept.

With regard to the predictive value of self-reported attachment styles, we found that attachment anxiety as measured by the ECR was related only to the number of reported positive feelings. This finding is somewhat unexpected. Although it is theoretically possible for anxious individuals to report less trust, sympathy, respect, etc. when confronted with a hypothetical separation from the attachment figure, it is more likely to find a relation with reported negative feelings because anxious individuals would be highly sensitive to relationship threats and react to separation with great distress and despair (Mikulincer & Shaver, 2003). The negative relation between avoidant attachment and reported negative feelings, on the other hand, does seem fully in line with theory and research showing that avoidant individuals dismiss negative emotional states and inhibit feelings of rejection, separation, or loss (Fraley & Shaver, 1997; Mikulincer et al., 2004).

Although our results clearly demonstrated the usefulness of the IAT for assessing the implicit attachment self-concept, there are still some limitations that need to be discussed. First, the predictive value of the IAT regarding distress responses was rather low. This could be attributed to the fact that participants were exposed to an imagined and not a real separation threat, which is likely to produce less intense distress reactions. Also note that, unfortunately, no manipulation checks were performed to control for individual differences in the vividness and ease with which participants imagined the separation scenario and these differences could have interfered with the obtained results. A second limitation concerns the fact that we measured distress responses only at the explicit level. Given that implicit and explicit processes are likely to differ, especially with

regard to avoidant attachment (see Mikulincer et al., 2004), future research should include both implicit and explicit responses to separation distress as a dependent variable. In addition, parallel explicit ratings of relational self-esteem and anxiety were not available, which prevented us from providing a more comprehensive test of the incremental validity of the IAT in relation to self-report. Finally, not all distress responses were predicted as well by the IAT measures and/or attachment questionnaires. On the other hand, the fact that the Self and Anxiety IAT were related only to the negative, and not to the positive, thoughts and feelings could be interpreted as support for the validity of the IAT measures because it supports the idea that attachment working models serve distress-regulation functions and are thus primarily oriented toward coping with negative stimuli (Mikulincer & Shaver, 2003).

In summary, the present findings provide first evidence that IAT measures of relational self-esteem and relational anxiety have the psychometric properties of reliability and validity that justify their use in attachment research. Our results also suggest that it is crucial to create the right conditions, in terms of IAT items and situational context, to improve the validity of the IAT as a measure of attachment working models. In view of future attachment research, we think it is important to further investigate the role of the implicit self-concept by exploring more complex and diverse self-representations in relation to different situational contexts and different attachment figures, and by encouraging further use of the IAT for assessing the cognitive and affective components of attachment working models that operate at a preattentive, automatic level.

Author Note

This research was supported by Grant G.0395.04 by the Research Foundation – Flanders (FWO). We would like to thank Lies Van Deursen for her work on the coding of the responses to the separation scenario.

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⁵ The Pearson correlations between the IATs and negative thoughts and feelings further support these conclusions (see Table 1).

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RELATIONSHIP BETWEEN ACADEMIC SELF-CONCEPT AND ACADEMIC PERFORMANCE OF JUNIOR HIGH SCHOOL STUDENTS IN GHANA

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Abstract

The study investigated the relationship between academic self-concept and academic performance of Junior High School (JHS) students in Ghana. Differences between the academic self-concept of male and female students as well as students from urban and rural schools were also investigated. Participants were 756 male and 714 female JHS2 students randomly selected from 24 Junior High Schools through stratified sampling. Two research instruments namely, achievement tests in mathematics, English language, social studies and integrated science, and academic self-concept scale with a Cronbach alpha reliability coefficient (internal consistency) of 0.84 were used to collect data. Pearson product moment correlation coefficient and t-test were used in analyzing the data. The results showed a positive relationship between academic self-concept and academic performance of students. A significant difference was also found between the academic self-concept of students in urban and rural Junior High Schools with students in urban schools recording higher scores. The educational implications are discussed. This includes the suggestion that the actions and reactions of teachers, parents and significant others toward students should encourage, suggest, assure and reinforce the students that they are academically capable and competent.

Keywords: Self-Concept, academic performance, gender, urban/rural

Introduction

Students' self-perceptions about their academic capabilities form an important part of their adjustment in school. These self-perceptions play a significant role in directing students' efforts towards their academic work.

Shavelson and Bolus as cited in Frazier (2009) explain that self-concept is multifaceted, hierarchical, organized and structured, descriptive and evaluative, stable, and yet increasingly situation specific. This explanation of Shavelson and Bolus is consistent with the multi-dimensional and hierarchical models of self-concept by Shavelson, Hubner, and Stanton (1976). These models propose that academic self-concept is one of several different facets of the self that contribute to an individual's general self-concept.

Academic self-concept is an evaluative self-perception that is formed through the student's experience and interpretation of the school environment (Marsh & Craven, 1997; Shavelson, Hubner & Stanton, 1976). According to Lent, Brown and Gore (1997), academic self-concept refers to specific attitudes, feelings and perceptions about an individual's intellectual or academic abilities which represent that individual's self beliefs and self-feelings regarding the academic setting.

Literature suggests that there are two differing perspectives of academic self-concept (Cokley, Komarraju, King, Cunningham & Muhammed, 2003). The first perspective asserts that like general self-concept, academic self-concept is also hierarchical and multi-dimensional based on specific subjects (Shavelson, Hubner & Stanton cited in Scales 2006). For example, these may be English self-concept or mathematics self-concept. Educational psychology provides compelling support for this perspective (Marsh, 1993a). This is so because, important academic outcomes are substantially related to academic self-concept but are relatively unrelated to self-esteem and non-academic component of self-concept (Bryne, 1996a; Marsh, 1993a).

The second perspective views academic self-concept unidimensionally, such that academic achievement is influenced more by the broad notion of academic self-concept often measured by overall Grade Point Average (Cokley, 2000). Researchers with this orientation, measure academic self-concept broadly using overall academic achievement, as opposed to examining subject specific perceptions.

While both positions are beneficial, it is useful to have an understanding of how students feel, generally, about their academic abilities (Scales, 2006; Cokley, et al, 2003), because studies have shown that there is a relationship between general academic self-concept and overall academic achievement (Reynold as cited in Scales, 2006).

Researchers have extensively debated whether prior academic self-concept influences academic achievement or prior academic achievement causes subsequent academic self-concept (Marsh, Hau and King, 2002). Marsh, Hau and King (2002) considered this a "chicken and egg" question. In an attempt at determining the direction of the relation between academic

self-concept and academic achievement, literature shows that three models; (a) the self enhancement, (b) skill development and (c) the reciprocal effects have been useful (Liu, 2009).

According to the self enhancement model, academic self-concept is a determinant of academic achievement. This means that academic achievement is a consequence of academic self-concept. On the contrary, the skill development proposes that academic self-concept is a consequence of academic achievement. To this model, enhancing students' academic self-concept is to improve students' academic performance (Liu, 2009). An examination of these two models reveals that the direction of the causality is towards one direction. This has generated a lot of controversy among researchers. As a compromise between the self-enhancement and skill development models, the reciprocal effects model emerged. According to this model, academic self-concept and academic achievement are reciprocally related and mutually reinforcing. That is, prior academic self-concept affects subsequent academic achievement and prior achievement affects subsequent academic self-concept (Guay Guay, Bolvin & Marsh as cited in Green, Nelson, Martin and Marsh, 2006).

Studies have been carried out to determine the direction of the causal relationship between academic self-concept and academic achievement. Marsh, Trautwein, Ludtke, Koller and Baumert (2005), for example, have suggested that improving students' academic achievement without enhancing their self-concept in the related academic domains is most likely to lead to only short-term gains. This suggestion by Marsh, et al (2005) was supported by Liu (2009). According to Liu (2009), students who have less satisfying academic performance may develop less positive academic confidence, which in the end, may lead to lower academic self-concept. On the other hand, students with less positive academic self-concept are more likely to lack learning motivation, which may result in poor academic performance. Liu (2009), thus, concluded that academic self-concept and academic achievement tend to affect and determine each other. This conclusion by Liu (2009) agrees with the suggestion by Marsh and Craven (undated) that academic self-concept is a cause as well as an effect of academic achievement in that, prior academic self-concept influences subsequent academic achievement beyond the effects of prior academic achievement.

Guay, Ratelle, Soy and Litalien (2010) in a study found that students who perceived themselves as academically competent obtained higher grades because their academic self-concept led them to be more autonomously motivated at school. In contrast, students with negative perceptions about their academic capabilities, according to Bandura et al as cited in Williams and Williams (2010), shy away from academic tasks because (a) they view them as personal threats, (b) have low aspirations and weak commitments to

task-related goals and (c) dwell on their personal deficiencies and adverse outcomes. Zimmerman, and Martinez-Pans cited in Williams and Williams (2010) explain that once these beliefs are formed, they affect a student's performance through their influence on choice of activities, the amount of effort applied, the level of persistence, and the kinds of meta-cognition learning strategies invoked.

Similarly, Skaalvik, Valas, and Sletta (1994) opined that students with high academic self-concept may focus on out-performing their colleagues academically. This orientation according to Skaalvik, et al. (1994) predicts a positive path between academic self-concept and performance goals. This means that students with positive academic self-concept might orient themselves towards the mastery of their school work.

In the field of education, research suggests that the attainment of a positive academic self-concept affects academic behaviours, academic choices, educational aspirations and subsequent academic performance (Marsh as cited in scales, 2006). In recognition of the role played by academic self-concept in students' academic performance, researchers have been concerned with analyzing the type of relationship that exists between academic self-concept and academic performance. Although the relationship between academic self-concept and academic performance is well established in the literature, little research work has been done on the topic in Ghana, especially at the Junior High School (JHS) level. This study, therefore, is intended to make a contribution towards filling this gap. To this end, the current study examined the relationship between academic self-concept and academic performance of Junior High School students in Ghana. Specifically, it examined:

- the relationship between academic self-concept and students' academic performance;
- the differences in the academic self-concept of students based on gender, and
- the differences in the academic self-concept of students based on location (Urban and Rural).

Hypotheses

1. H_0 : There is no statistically significant relationship between academic self-concept and academic performance of students in Ghanaian JHSs
2. H_0 : There is no statistically significant difference between the academic self-concept of male and female students in Ghanaian JHSs

3. Ho: There is no statistically significant difference between the academic self- concept of students in Ghanaian Urban and Rural JHS.

The assumption here is that research hypotheses are non-directional: Based on the literature review, why not formulate a directional hypotheses for 1 and 3.

Methodology

Participants

The study was a national survey and in order to make the sample have a national representation, steps were taken through appropriate sampling procedures to ensure that students from different parts of the country were included. A sample of 1,470 JHS Form two students was selected from 24 public Junior High Schools through stratified random sampling using gender and location as criteria for stratification. The participants consisted of 756 (51.4%) males and 714 (48.6%) females. Out of the 1,470 participants, 750 (51.0%) were from urban schools and 720 (49.0%) were from rural schools.

Instruments

The main instruments that were used to collect data for the study were academic achievement tests in mathematics, English language, social studies and integrated Science which are the four core subjects taught at the JHS, and the Academic Self-concept Scale (ASS). The test items were constructed by the Centre for Performance Monitoring and Evaluation, a consultancy centre in Accra and were based on the JHS 2 syllabi. The tests were in multiple-choice item format with four options. These tests were administered to all the respondents. The mean score of each student in the four subjects was computed and used as proxy for academic performance.

The Academic Self-concept Scale was developed by the researchers after an extensive review of literature. This instrument consisted of two sections. The first section contained five items that focused on the demographic characteristics of respondents. The second section contained twenty items which measured the academic self-concept of the respondents. All the items in this section were structured on a five-point Likert type scale of Strongly Agree (5), Agree (4), Not Sure (3), Disagree (2) and Strongly Disagree (1). The Academic Self-concept Scale had a Cronbach alpha reliability coefficient of 0.84.

Procedure

The research instruments were personally administered by the researchers. At each of the JHS used for the study, all the selected students

were gathered in a classroom. The purpose of the study was explained to the students after which the research instruments were distributed to them. The Academic Self-concept Scale was the first instrument to be administered. It was followed by the tests in mathematics and English language. The students were given a fifteen minute break, after which the Social Studies and Integrated Science tests were administered. The test in English language, social studies and integrated science which consisted of 25 items each, were written within 25 minutes. However, the mathematics test which consisted of 20 items was written within 30 minutes. Each of the tests was scored out of 100 and the mean score of each participant in the four tests was computed and used as the academic performance of the participant.

Results

It was hypothesized that there is no statistically significant relationship between academic self-concept and academic performance of students in Ghanaian Junior High Schools. The results of the analysis are presented in Table 1.

Table 1: Result of Pearson Product Moment Correlation Analysis between Academic Self-Concept and Academic Performance of Students in Ghanaian JHS (N = 1,470)

Variable	Mean	SD	r	Df	p-value
Academic self-concept	61.563	7.111	.306**	1468	.000
Academic Performance	52.604	11.858			

** Correlation is significant at 0.01 level (2 tailed)

The information in Table 1 reveals a statistically significant relationship between academic self-concept and academic performance ($r = .306$, $df = 1468$, $p < 0.01$). The information shows a positive relationship between academic self-concept and the academic performance of students in Ghanaian Junior High Schools. On account of the results, the null hypothesis is rejected.

A second hypothesis formulated for the study was, there is no statistically significant difference in the academic self-concept of male and female students in Ghanaian JHS. The results of the analysis are presented in Table 2.

Table 2: Results of t-test Analysis of Ghanaian JHS Students' Academic Self-Concept by Gender (Male/Female)

Gender	N	Mean	SD	t-value	df	p-value
Male	756	61.738	7.307	.970	1468	.332
Female	714	61.378	6.898			

Not Significant $P < 0.05$

The results in Table 2 indicate that statistically, there is no significant difference in the academic self-concept of students in Ghanaian Junior High Schools on the basis of gender $t(1470)=0.970$, $p>0.05$. The null hypothesis is therefore retained.

A third hypothesis was that there is no statistically significant difference between the academic self-concept of students in Ghanaian Urban and Rural Junior High Schools. The results of the analysis are shown in Table 3.

Table 3: Results of t-test Analysis of Ghanaian JHS Students' Academic Self-Concept by Settlement/Location (Urban/Rural)

Location	N	Mean	SD	t-value	df	p-value
Urban	750	62.420	6.902	4.749	1468	.000
Rural	720	60.671	7.220			

Significant $P<0.05$

The data in Table 3 shows that students from Urban Junior High Schools had a mean score of 62.420 and a standard deviation of 6.902 on the academic self-concept scale, while their counterparts in Rural Junior High Schools had a mean score of 60.671 and a standard deviation of 7.220. Further, the data shows a t-value of 4.749 and a p-value of 0.000. This shows that $p<0.05$ at $df = 1468$. The analysis, therefore, shows a statistically significant difference between the academic self-concept of students from Urban and Rural schools. The analysis shows that students from Urban JHS, had a higher academic self-concept than their colleagues from Rural JHS. The null hypothesis is therefore rejected.

Discussion

The results of the study showed a positive and statistically significant relationship between academic self-concept and academic performance of students in Ghanaian Junior High Schools. This finding suggests that the views that students hold about their academic competence and capabilities are valuable variables that have the potential to facilitate the realization of students goals in a range of settings including the school.

This finding underscores the importance of how students feel about their competence and ability to be successful in their educational programmes. Students who are convinced that they are good and have the ability to succeed or control their educational experiences are likely to make efforts to excel in school-related work. This argument corroborates the explanation of Bandura as cited in Wentzel and Wigfield (1998) that students who think they are capable and can accomplish an academic task or activity are more likely to choose to do it, keep working on it even when they encounter difficulties and ultimately complete it successfully.

This finding buttresses the assertion by Akey (2006) that students' beliefs about their competence and expectations for success in school are linked to the students' level of engagement as well as emotional states that promote their ability to be academically successful. The finding also supports the research findings of Bryne as cited in Liu (2009); Guay, Ratelle, Roy and Litalien (2010). Bryne in a study in Canada found that students who performed higher academically had a higher academic self-concept. The results of Bryne's study showed that academic self-concept did not only determine school achievement, but also served as a more effective discriminator between low and high ability students. Guay, et al (2010) on their part, found that students who perceived themselves as academically competent obtained higher grades because their academic self-concept led them to be more motivated at school.

The results of the study did not reveal a statistically significant difference between the academic self-concept of male and female students in Ghanaian Junior High Schools. This finding by implication is that, both male and female students in Ghanaian Junior High Schools did not differ in the views they hold about their academic competence and capabilities. Perhaps, what could have accounted for this finding is the change in the landscape of the education sector in particular and the Ghanaian society as a whole. Equal opportunities are given to both male and female students in terms of access to school, provision of material and psychological support by the government, parents and teachers. This has made both sexes to be competitive, venturesome and open-minded in the pursuit of their educational goals. While this finding supports the research finding of Nuthanap (2007), it contradicts the results of previous studies by Brunner, et al (2009); Marsh, et al. as cited in Brunner, et al. (2009). Brunner, et al. (2009) in a cross-cultural study, evaluated gender differences in terms of point biserial correlations. The results of their study showed a positive correlation indicating that boys had a higher academic self-concept than girls. In a country specific analysis, the results of their study showed that gender differences in academic self-concept varied considerably across countries. Similarly, Marsh, et al. as cited in Brunner, et al. (2009) found that boys had a higher mathematics self-concept and girls had higher verbal self-concept. These observed gender differences in domain-specific academic self-concept according to Skaalvik and Skaalvik (2004) are congruent with the gender stereotype explanation proposing mathematics to be a male domain and females to have higher verbal ability.

The study revealed a statistically significant difference between the academic self-concept of students in Urban and Rural Junior High Schools in Ghana. The results showed that students in Urban JHS had a higher academic self-concept than their colleagues in Rural Junior High Schools. A

possible explanation for this finding could be the socio-economic status of the parents of the students. A chi-square analysis of the socio-economic status of parents of the students revealed that while 324 (43.2%) of the parents of students in Urban Junior High Schools had Post-secondary and University education, 129(17.9%) of parents of students in Rural Junior High Schools had the same level of education. It could be that with their level of education, parents of students in Urban Junior High Schools were more conscious of the benefits of education, communicated this knowledge to their school going children, and inspired them to aspire to see themselves as academically capable. Perhaps, this invariably served as a motivator to the students in Urban Junior High Schools to see themselves as more academically capable and competent than their counterparts in Rural Junior High Schools. This finding however, is inconsistent with the research findings of Nuthanap (2007). Nuthanap in a study in Dharwad found that students in rural schools had a higher self-concept than their counterparts in urban schools. The results of his study showed that while students in rural schools had a mean score of 92.14, their urban colleagues had a mean score of 87.87 on the self-concept scale.

Conclusion

The study has provided evidence to show that there is a positive relationship between academic self-concept and the academic performance of students at the Junior High Schools level in Ghana. The study also showed a statistically significant difference between the academic self-concept of students in Urban and Rural Junior High Schools. However, the study did not reveal any statistically significant difference between the academic self-concept of male and female students in Ghanaian Junior High Schools. This finding provides evidence to suggest that when both male and female students are given equal opportunities and support in school, both sexes will see themselves as academically capable and competent and will thus strive to work hard to achieve their educational goals.

Educational Implications

The finding of the study supports the view that academic self-concept correlates positively with academic performance of students. Individuals with high academic self-concepts are more likely than those with low academic self-concept to study hard in order to perform well academically. The actions and reactions of teachers, parents and significant others towards students should be such that they are intended to encourage, suggest, assure and reinforce students that they are academically capable and can do well if they work harder. These words of encouragement are likely to have an impact on the self-belief of the students making them see themselves as

academically competent and capable, and thus strive to study hard in order to perform well academically.

Gender difference in the academic self-concept of students was not found in the study. Male and female students had the same level of academic self-concept. To sustain this level of academic self-concept in the students, parents, teachers and the Ghanaian society as a whole should see both male and female students as equal competitors in education and should extend equal attention and opportunities to both sexes. Any form of gender bias or stereotype in the education sector that favours any of the sexes should be avoided.

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Romantic Love Conceptualized as an Attachment Process

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This article explores the possibility that romantic love is an attachment process—a biosocial process by which affectional bonds are formed between adult lovers, just as affectional bonds are formed earlier in life between human infants and their parents. Key components of attachment theory, developed by Bowlby, Ainsworth, and others to explain the development of affectional bonds in infancy, were translated into terms appropriate to adult romantic love. The translation centered on the three major styles of attachment in infancy—secure, avoidant, and anxious/ambivalent—and on the notion that continuity of relationship style is due in part to mental models (Bowlby's "inner working models") of self and social life. These models, and hence a person's attachment style, are seen as determined in part by childhood relationships with parents. Two questionnaire studies indicated that (a) relative prevalence of the three attachment styles is roughly the same in adulthood as in infancy, (b) the three kinds of adults differ predictably in the way they experience romantic love, and (c) attachment style is related in theoretically meaningful ways to mental models of self and social relationships and to relationship experiences with parents. Implications for theories of romantic love are discussed, as are measurement problems and other issues related to future tests of the attachment perspective.

One of the landmarks of contemporary psychology is Bowlby's (1969, 1973, 1980) three-volume exploration of attachment, separation, and loss, the processes by which affectional bonds are forged and broken. Bowlby's major purpose was to describe and explain how infants become emotionally attached to their primary caregivers and emotionally distressed when separated from them, although he also contended that "attachment behavior [characterizes] human beings from the cradle to the grave" (1979, p. 129). In recent years, laboratory and naturalistic studies of infants and children (summarized by Bretherton, 1985, and Maccoby, 1980) have provided considerable support for attachment theory, which was proposed by Bowlby and elaborated by several other investigators. The purpose of this article is to explore the possibility that this theory, designed primarily with infants in mind, offers a valuable perspective on adult romantic love. We will suggest that romantic love is an attachment process (a process of becoming attached),

experienced somewhat differently by different people because of variations in their attachment histories.

For our purpose, which is to create a coherent framework for understanding love, loneliness, and grief at different points in the life cycle, attachment theory has several advantages over existing approaches to love (Shaver, Hazan, & Bradshaw, in press). First, although many researchers (e.g., Rubin, 1973; Hatfield & Sprecher, 1985) have attempted to assess love with unidimensional scales, love appears to take multiple forms (e.g., Dion & Dion, 1985; Hendrick & Hendrick, 1986; Lee, 1973; Steck, Levitan, McLane, & Kelley, 1982; Sternberg, 1986; Tennov, 1979). Attachment theory explains how at least some of these forms develop and how the same underlying dynamics, common to all people, can be shaped by social experience to produce different relationship styles. Second, although various authors have portrayed certain forms of love as healthy and others as unhealthy, or at least problematic (e.g., Hindy & Schwarz, 1984; Tennov, 1979), they have not said how the healthy and unhealthy forms fit together in a single conceptual framework. Attachment theory not only provides such a framework, but it also explains how both healthy and unhealthy forms of love originate as reasonable adaptations to specific social circumstances. The portrait of love offered by attachment theory includes negative as well as positive emotions: for example, fear of intimacy (discussed by Hatfield, 1984), jealousy (e.g., Hindy & Schwarz, 1985), and emotional ups and downs (Tennov, 1979) as well as caring (Rubin, 1973), intimacy (Sternberg, 1986), and trust (Dion & Dion, 1985). Third, attachment theory deals with separation and loss and helps explain how loneliness and love are related (Shaver & Rubenstein, 1980; Parkes &

We are grateful to Donna Bradshaw for sharing her expertise in the areas of attachment theory and research, to Marty Meitus for allowing us to conduct Study 1 in the *Rocky Mountain News*, to Kathy Purcell for keypunching, to Rick Canfield for assistance in all phases of the project, and to Mary Ainsworth, John Bowlby, Harry Gollob, Lee Kirkpatrick, Roger Kobak, Anne Peplau, Harry Reis, Judith Schwartz, Arlene Skolnick, and Robert Sternberg for helpful comments on convention presentations and earlier drafts of this article.

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Weiss, 1983; Weiss, 1973). Finally, attachment theory links adult love with socioemotional processes evident in children and nonhuman primates; it places love within an evolutionary context (Wilson, 1981). (See Sternberg & Barnes, in press, for an anthology of recent approaches to the study of adult love.)

Attachment Theory and Research

Bowlby's attachment theory grew out of observations of the behavior of infants and young children who were separated from their primary caregiver (usually the mother) for various lengths of time. Bowlby noticed what primate researchers had also observed in the laboratory and the field: When a human or primate infant is separated from its mother, the infant goes through a predictable series of emotional reactions. The first is *protest*, which involves crying, active searching, and resistance to others' soothing efforts. The second is *despair*, which is a state of passivity and obvious sadness. And the third, discussed only with reference to humans, is *detachment*, an active, seemingly defensive disregard for and avoidance of the mother if she returns. Because of the remarkable similarities between human infants and other primate infants, Bowlby was led to consider the evolutionary significance of infant-caregiver attachment and its maintenance in the face of separation.

The attachment system, as Bowlby called the complex constellation of attachment feelings and behaviors, seems to have evolved to protect infants from danger by keeping them close to the mother. When very young, a human infant can do little more than cry, make eye contact, smile, and snuggle in to encourage its mother to keep it near. Once mobile, however, it can actively pursue its mother and vocalize to her. Bowlby and other observers of both human and primate behavior have noticed that when an infant is healthy, alert, unafraid, and in the presence of its mother, it seems interested in exploring and mastering the environment and in establishing affiliative contact with other family and community members. Researchers call this using the mother as a secure base.

Attachment theory can be summarized in three propositions, phrased clearly in the second volume of Bowlby's trilogy:

The first [proposition] is that when an individual is confident that an attachment figure will be available to him whenever he desires it, that person will be much less prone to either intense or chronic fear than will an individual who for any reason has no such confidence. The second proposition concerns the sensitive period during which such confidence develops. It postulates that confidence in the availability of attachment figures, or lack of it, is built up slowly during the years of immaturity—infancy, childhood, and adolescence—and that whatever expectations are developed during those years tend to persist relatively unchanged throughout the rest of life. The third proposition concerns the role of actual experience. It postulates that the varied expectations of the accessibility and responsiveness of attachment figures that individuals develop during the years of immaturity are tolerably accurate reflections of the experiences those individuals have actually had. (Bowlby, 1973, p. 235)

The formation during early childhood of a smoothly functioning (i.e., secure) attachment relationship with a primary caregiver, although the norm in our society, is by no means guaranteed. Research by Ainsworth and others suggests that a mother's sensitivity and responsiveness to her infant's signals

and needs during the first year of life are important prerequisites. Mothers who are slow or inconsistent in responding to their infant's cries or who regularly intrude on or interfere with their infant's desired activities (sometimes to force affection on the infant at a particular moment) produce infants who cry more than usual, explore less than usual (even in the mother's presence), mingle attachment behaviors with overt expressions of anger, and seem generally anxious. If, instead, the mother consistently rebuffs or rejects the infant's attempts to establish physical contact, the infant may learn to avoid her. On the basis of their observations, Ainsworth, Blehar, Waters, and Wall (1978) delineated three styles or types of attachment, often called *secure*, *anxious/ambivalent*, and *avoidant*. Infants in the anxious/ambivalent category frequently exhibit the behaviors Bowlby called *protest*, and the avoidant infants frequently exhibit the behaviors he called *detachment*. A major goal of this article is to apply this three-category system to the study of romantic love.

In their description of the three attachment styles, Ainsworth et al. (1978) referred to infants' expectations concerning their mothers' accessibility and responsiveness. This fits with Bowlby's claim that infants and children construct inner working models of themselves and their major social-interaction partners. Because the expectations incorporated in these models are some of the most important sources of continuity between early and later feelings and behaviors, they deserve special attention. According to Bowlby, working models (which we will also call *mental models*) and the behavior patterns influenced by them are central components of personality. The claim of cross-situational and cross-age continuity is still controversial but is supported by a growing list of longitudinal studies from infancy through the early elementary school years (Dontas, Maratos, Fafoutis, & Karangelis, 1985; Erickson, Sroufe, & Egeland, 1985; Main, Kaplan, & Cassidy, 1985; Sroufe, 1983; Waters, Wippman, & Sroufe, 1979). This evidence for continuity adds plausibility to the notion that a person's adult style of romantic attachment is also affected by attachment history.

Continuity, according to Bowlby (1973), is due primarily to the persistence of interrelated mental models of self and social life in the context of a fairly stable family setting:

Confidence that an attachment figure is, apart from being accessible, likely to be responsive can be seen to turn on at least two variables: (a) whether or not the attachment figure is judged to be the sort of person who in general responds to calls for support and protection; [and] (b) whether or not the self is judged to be the sort of person towards whom anyone, and the attachment figure in particular, is likely to respond in a helpful way. Logically these variables are independent. In practice they are apt to be confounded. As a result, the model of the attachment figure and the model of the self are likely to develop so as to be complementary and mutually confirming. (Bowlby, 1973, p. 238)

Love as Attachment

So far, no one has attempted to conceptualize the entire range of romantic love experiences in a way that parallels the typology developed by Ainsworth and her colleagues. Nor has anyone with an interest in romantic relationships pursued Bowlby's idea that continuity in relationship style is a matter of mental models of self and social life. Finally, no one has explored the

possibility that the specific characteristics of parent-child relationships identified by Ainsworth et al. as the probable causes of differences in infant attachment styles are also among the determinants of adults' romantic attachment styles. These are the major aims of this article.

We derived the following hypotheses by applying Bowlby's and Ainsworth's ideas and findings as literally as possible to the domain of adult love.

Hypothesis 1

Given the descriptions of the secure, avoidant, and anxious/ambivalent styles, we expected roughly 60% of adults to classify themselves as secure and the remainder to split fairly evenly between the two insecure types, with perhaps a few more in the avoidant than in the anxious/ambivalent category. In a summary of American studies of the three types of infants, Campos, Barrett, Lamb, Goldsmith, and Stenberg (1983) concluded that 62% are secure, 23% are avoidant, and 15% are anxious/ambivalent. Given a diverse sample of American adults, we thought it reasonable to expect approximately the same proportions.

Hypothesis 2

Just as the feelings an infant presumably experiences in the relationship with his or her mother are thought to reflect the quality of attachment to her, we expected that different types of respondents—secure, avoidant, and anxious/ambivalent—would experience their most important love relationships differently. We predicted that the most important love experience of a secure adult would be characterized by trust, friendship, and positive emotions. For avoidant adults, love was expected to be marked by fear of closeness and lack of trust. Anxious/ambivalent adults were expected to experience love as a preoccupying, almost painfully exciting struggle to merge with another person. This last style is similar to what Hindy and Schwarz (1984) called anxious romantic attachment and Tenov (1979) called limerence.

Hypothesis 3

Respondents' working models of self and relationships were also expected to differ according to attachment style. Secure types should believe in enduring love, generally find others trustworthy, and have confidence that the self is likable. Avoidant types should be more doubtful of the existence or durability of romantic love and believe that they do not need a love partner in order to be happy. Anxious/ambivalent types should fall in love frequently and easily but have difficulty finding true love. They should also have more self-doubts than the other two types because, unlike avoidant respondents, they do not repress or attempt to hide feelings of insecurity.

Hypothesis 4

Because attachment style is thought to develop in infancy and childhood, we expected respondents of the three types to report different attachment histories. According to the theory, secure respondents should remember their mothers as dependably responsive and caring; avoidant respondents should report that

their mothers were generally cold and rejecting; and anxious/ambivalent respondents should remember a mixture of positive and negative experiences with their mothers. As less research has been conducted with fathers, we tentatively expected the findings related to them to be roughly similar to the findings for mothers.

Hypothesis 5

Finally, because the attachment needs of insecure respondents are unlikely to be fully met, avoidant and anxious/ambivalent respondents should be especially vulnerable to loneliness. The avoidant types, however, may defend against or attempt to hide this vulnerable feeling and so report less loneliness than anxious/ambivalent respondents do.

Study 1

In an initial effort to test the attachment-theory approach to romantic love, we designed a "love quiz" to be printed in a local newspaper. As explained by Shaver and Rubenstein (1983), the newspaper questionnaire method has been used in a wide variety of studies, always with results that approximate those from more expensive, more strictly representative surveys. The main difference between newspaper survey respondents and participants in representative sample surveys is that the former have slightly higher education levels. Also, depending on the topic, newspaper surveys tend to draw more female than male respondents. Neither of these biases seemed to preclude a valuable initial test of our ideas, and the gains in sample size and heterogeneity appeared to outweigh the cost of mild unrepresentativeness.

A single-item measure of the three attachment styles was designed by translating Ainsworth et al.'s (1978) descriptions of infants into terms appropriate to adult love. The love-experience questionnaire, which we will describe in detail, was based on previous adult-love measures and extrapolations from the literature on infant-caregiver attachment. The measure of working models was based on the assumption that conscious beliefs about romantic love—concerning, for example, whether it lasts forever and whether it is easy or difficult to find—are colored by underlying, and perhaps not fully conscious, mental models. The measure of attachment history was a simple adjective checklist used to describe childhood relationships with parents and the parents' relationship with each other.

Method

Subjects. Analyses reported here are based on the first 620 of over 1,200 replies received within a week following publication of the questionnaire. (The major findings were stable after the first few hundred, so additional replies were not keypunched.) Of these 620 replies, 205 were from men and 415 were from women. The subjects ranged in age from 14 to 82, with a median age of 34 and a mean of 36. Average household income was \$20,000 to \$30,000; average education level was "some college." Just over half (51%) were Protestant, 22% were Catholic, 3% were Jewish, 10% were atheist or agnostic, and 13% were "other." Ninety-one percent were "primarily heterosexual," 4% were "primarily homosexual," and 2% were "primarily bisexual" (3% chose not to answer). Forty-two percent were married at the time of the survey; 28%

were divorced or widowed, 9% were "living with a lover," and 31% were dating. (Some checked more than one category.)

Measures and procedure. The questionnaire appeared in the July 26, 1985, issue of the *Rocky Mountain News* on the first and second pages of the Lifestyles section. Besides being highly visible there, it was referred to in a banner headline at the top of the paper's front page: "Tell us about the love of your life; experts ask 95 questions about your most important romance." The instructions included the following sentences: "The questionnaire is designed to look at the most important love relationship you have ever had, why you got involved in it, and why it turned out the way it did. . . . It may be a past or a current relationship, but choose only the most important one." Given that there was only enough room to ask about one relationship, we decided to have subjects focus on the one they considered most important.

The questionnaire was divided into three parts. The first contained 56 statements concerning the subject's most important relationship, for example, "I (considered/consider) _____ one of my best friends" and "I (loved/love) _____ so much that I often (felt/feel) jealous." (The blank referred to the most important lover's name.) Responses were recorded by circling *SD*, *D*, *A*, or *SA* to indicate points along a *strongly disagree* to *strongly agree* continuum. The 56 statements, 4 each for 14 a priori subscales, were adapted from previous love questionnaires (Dion & Dion, 1985; Hatfield & Sprecher, 1985; Hindy & Schwarz, 1984; Lasswell & Lobsenz, 1980; Rubin, 1973; Steffen, McLaney, & Hustedt, 1984) or suggested by the literature on infant-caregiver attachment (e.g., Ainsworth et al., 1978).

A principal-components analysis followed by equimax rotation was performed on the 56-item measure. Thirteen factors had eigenvalues greater than 1.0, and 12 corresponded to a priori scales. Items loading above .40 on 1 of the 12 predicted factors were analyzed for reliability, and items that reduced coefficient alpha were deleted. Table 1 provides the names of the 12 scales and a sample item, the number of items retained, and coefficient alpha for each. Alpha ranged from .64 to .84 with a mean of .76, which seemed adequate for preliminary tests of the hypotheses.

Part 2 of the questionnaire asked whether the described relationship was current or past (61% were current, 39% were past), what the subject's relationship to that person was at the time of the survey, how long the relationship had lasted, how many times the subject had been in love, and whether he or she had experienced crushes before age 10. This part of the questionnaire also contained demographic questions.

Part 3 dealt with attachment style and attachment history. It included sections dealing with the subject's childhood relationships with his or her mother and father and the parents' relationship with each other (the specific items will be discussed more fully in the *Results and Discussion* section). Also included were questions concerning how the subject typically felt in relationships (the exact wording appears in Table 2) and what he or she believed concerning the typical course of romantic love. The questionnaire concluded with the open-ended question "Can you add anything that might help us understand romantic love?" and a request for the subject's name and phone number if he or she was willing to be interviewed. (Over 60% of the subjects provided this information.)

Subjects were asked to mail their reply forms to the *Rocky Mountain News* within a week.

Results and Discussion

Frequencies of the three attachment styles. Hypothesis 1 concerned whether newspaper readers could meaningfully classify themselves as avoidant, anxious/ambivalent, or secure in their most important romantic relationship, given fairly simple descriptions of the three attachment styles, and in particular whether the frequencies of the types would be similar to those found in studies of infants and young children. Table 2 shows

Table 1
Information on Love-Experience Scales

Scale name	Sample item	No. of items	α
Happiness	My relationship with _____ (made/makes) me very happy.	4	.84
Friendship	I (considered/consider) _____ one of my best friends.	4	.78
Trust	I (felt/feel) complete trust in _____.	4	.83
Fear of closeness	I sometimes (felt/feel) that getting too close to _____ could mean trouble.	3	.64
Acceptance	I (was/am) well aware of _____'s imperfections but it (did/does) not lessen my love.	2	.67
Emotional extremes	I (felt/feel) almost as much pain as joy in my relationship with _____.	3	.81
Jealousy	I (loved/love) _____ so much that I often (felt/feel) jealous.	4	.82
Obsessive preoccupation	Sometimes my thoughts (were/are) uncontrollably on _____.	3	.70
Sexual attraction	I (was/am) very physically attracted to _____.	4	.80
Desire for union	Sometimes I (wished/wish) that _____ and I were a single unit, a "we" without clear boundaries.	3	.79
Desire for reciprocation	More than anything, I (wanted/want) _____ to return my feelings.	3	.70
Love at first sight	Once I noticed _____, I was hooked.	4	.70

how the alternatives were worded and provides the percentage of subjects endorsing each description.

Just over half (56%) classified themselves as secure, whereas the other half split fairly evenly between the avoidant and anxious/ambivalent categories (25% and 19%, respectively). These figures are similar to proportions reported in American studies of infant-mother attachment (Campos et al., 1983, summarized the proportions obtained in these studies as 62% secure, 23% avoidant, and 15% anxious/ambivalent). Our results suggest, but of course do not prove, that subjects' choices among the alternatives were nonrandom and may have been determined by some of the same kinds of forces that affect the attachment styles of infants and children. The remainder of the results argue for the validity of subjects' self-classifications.

Differences in love experiences. The second hypothesis predicted that subjects with different self-designated attachment styles would differ in the way they characterized their most important love relationship. Table 3 presents the mean subscale scores (each with a possible range of 1 to 4) for each attachment type, along with the *F* ratio from a one-way analysis of variance (ANOVA) on scores for each subscale.

In line with the hypothesis, secure lovers described their most

Table 2
Adult Attachment Types and Their Frequencies
(Newspaper Sample)

Question: Which of the following best describes your feelings?

Answers and percentages:

Secure ($N = 319$, 56%): I find it relatively easy to get close to others and am comfortable depending on them and having them depend on me. I don't often worry about being abandoned or about someone getting too close to me.

Avoidant ($N = 145$, 25%): I am somewhat uncomfortable being close to others; I find it difficult to trust them completely, difficult to allow myself to depend on them. I am nervous when anyone gets too close, and often, love partners want me to be more intimate than I feel comfortable being.

Anxious/Ambivalent ($N = 110$, 19%): I find that others are reluctant to get as close as I would like. I often worry that my partner doesn't really love me or won't want to stay with me. I want to merge completely with another person, and this desire sometimes scares people away.

Note. Twenty-one subjects failed to answer this question, and 25 checked more than one answer alternative.

important love experience as especially happy, friendly, and trusting. They emphasized being able to accept and support their partner despite the partner's faults. Moreover, their relationships tended to endure longer: 10.02 years, on the average, compared with 4.86 years for the anxious/ambivalent subjects and 5.97 years for the avoidant subjects, $F(2, 568) = 15.89$, $p < .001$. This was the case even though members of all three groups were 36 years old on the average. Only 6% of the secure group had been divorced, compared with 10% of the anxious/ambivalent group and 12% of the avoidant group, $F(2, 573) = 3.36$, $p < .05$.

The avoidant lovers were characterized by fear of intimacy, emotional highs and lows, and jealousy. They never produced the highest mean on a positive love-experience dimension. The anxious/ambivalent subjects experienced love as involving obsession, desire for reciprocation and union, emotional highs and lows, and extreme sexual attraction and jealousy. They provided a close fit to Tennov's (1979) description of limerence and Hindy and Schwarz's (1984) conception of anxious romantic attachment, suggesting that the difference between what Tennov called love and limerence is the difference between secure and anxious/ambivalent attachment.

Although the average love experiences of people in the three different attachment categories differed significantly, for most of the subscales all three types scored on the same side of the midpoint (2.50), emotional extremes and jealousy being the only exceptions. Thus, there appears to be a core experience of romantic love shared by all three types, with differences in emphasis and patterning between the types. The results also support the ideas that love is a multidimensional phenomenon and that individuals differ in more ways than the intensity of their love experiences. Especially noteworthy was the fact that the ordering of means for the different attachment styles differed for different dimensions. For the dimensions of happiness, friendship, trust, and fear of closeness, secure subjects differed significantly from avoidant and anxious/ambivalent

subjects but these two insecure groups did not differ from each other. On the dimensions of obsessive preoccupation, sexual attraction, desire for union, desire for reciprocation, and love at first sight, anxious/ambivalent subjects differed significantly from avoidant and secure subjects, who did not differ from each other. On the acceptance dimension, avoidant subjects (the least accepting) differed from anxious/ambivalent and secure subjects, and on emotional extremes and jealousy, all three groups were statistically distinct. This variety of patterns supports the claim that there are three different love styles, not simply three points along a love continuum.

Differences in mental models. We attempted to assess what Bowlby (1969) called working models of relationships by using the items shown in Table 4. Each was either checked or not checked as describing how the subject generally "view[s] the course of romantic love over time." These dichotomous answers were analyzed by attachment style, using a one-way ANOVA. (Because the answers were scored as either 0 or 1, the means can be read as proportions.)

In line with the third hypothesis, secure lovers said that romantic feelings wax and wane but at times reach the intensity experienced at the start of the relationship and that in some relationships romantic love never fades. The avoidant lovers said the kind of head-over-heels romantic love depicted in novels and movies does not exist in real life, romantic love seldom lasts, and it is rare to find a person one can really fall in love with. The anxious/ambivalent subjects claimed that it is easy to fall in love and that they frequently feel themselves beginning to fall, although (like the avoidant subjects) they rarely find what they would call real love. Like the secure subjects, the anxious/ambivalent subjects said they believe that romantic feelings wax and wane over the course of a relationship.

Differences in attachment history. Attachment history with parents was assessed in two ways. Subjects were asked whether

Table 3
Love-Subscale Means for the Three Attachment
Types (Newspaper Sample)

Scale name	Avoidant	Anxious/ ambivalent	Secure	$F(2, 571)$
Happiness	3.19 _a	3.31 _a	3.51 _b	14.21***
Friendship	3.18 _a	3.19 _a	3.50 _b	22.96***
Trust	3.11 _a	3.13 _a	3.43 _b	16.21***
Fear of closeness	2.30 _a	2.15 _a	1.88 _b	22.65***
Acceptance	2.86 _a	3.03 _b	3.01 _b	4.66**
Emotional extremes	2.75 _a	3.05 _b	2.36 _c	27.54***
Jealousy	2.57 _a	2.88 _b	2.17 _c	43.91***
Obsessive preoccupation	3.01 _a	3.29 _b	3.01 _a	9.47***
Sexual attraction	3.27 _a	3.43 _b	3.27 _a	4.08*
Desire for union	2.81 _a	3.25 _b	2.69 _a	22.67***
Desire for reciprocation	3.24 _a	3.55 _b	3.22 _a	14.90***
Love at first sight	2.91 _a	3.17 _b	2.97 _a	6.00**

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4
Proportion of Respondents Who Endorsed Each Mental-Model Statement About Love (Newspaper Sample)

Statement	Avoidant	Anxious/ ambivalent	Secure	F(2, 571)
1. The kind of head-over-heels romantic love depicted in novels and movies doesn't exist in real life.	.25 _a	.28 _a	.13 _b	8.81***
2. Intense romantic love is common at the beginning of a relationship, but it rarely lasts forever.	.41 _a	.34 _b	.28 _b	3.83*
3. Romantic feelings wax and wane over the course of a relationship, but at times they can be as intense as they were at the start.	.60 _a	.75 _b	.79 _b	9.86***
4. In some relationships, romantic love really lasts; it doesn't fade with time.	.41 _a	.46 _a	.59 _b	7.48***
5. Most of us could love many different people equally well; there is no "one true love" which is "meant to be."	.39	.36	.40	ns
6. It's easy to fall in love. I feel myself beginning to fall in love often.	.04 _a	.20 _b	.09 _a	9.33***
7. It's rare to find someone you can really fall in love with.	.66 _a	.56 _a	.43 _b	11.61***

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

they had ever been separated from either parent for "what seemed like a long time" and whether the parents ever separated or divorced. They were also asked to describe how each parent had generally behaved toward them during childhood (using 37 adjectives, such as *responsive*, *caring*, *critical*, and *intrusive*, derived from a pilot study in which subjects answered open-ended questions about their childhood relationships with parents) and the parents' relationship with each other (using 12 similarly derived adjectives such as *affectionate*, *unhappy*, and *argumentative*).

There were no significant differences among the three attachment types in likelihood or duration of separation from parents during childhood, even when analyzed by reason for separation. In addition, parental divorce seemed unrelated to attachment type, even though quality of relationships with parents was associated with type. The best predictors of adult attachment type were respondents' perceptions of the quality of their relationship with each parent and the parents' relationship with each other.

A one-way ANOVA, with attachment style as the independent variable, on each of the 86 child-parent and parent-parent relationship variables yielded 51 F s that were significant at the .05 level, clearly more than expected by chance. (Thirty-seven of these were significant at the .01 level; 15 were significant at the .001 level.) Because many of the variables were correlated, which meant that many of the ANOVA results were redundant, a hierarchical discriminant-function analysis was performed to assess predictability of membership in the three attachment categories from a combination of attachment-history variables. Subjects with no missing data on the variables involved ($N = 506$) were included in the analysis. The 22 attachment-history variables shown in Table 5 (plus one with a correlation below .20) were retained as significant predictors of attachment type. Both discriminant functions (two being the maximum possible number given three target groups) were statistically significant, with a combined $\chi^2(46, N = 506) = 131.16, p < .001$. After removal of the first function, $\chi^2(22, N = 506)$ was 40.94 ($p < .01$). The two functions accounted for 69.87% and 30.13%, respectively, of the between-groups variability.

As shown in Figure 1, the first discriminant function separated secure subjects from the two kinds of insecure subjects. The second function separated avoidant from anxious/ambivalent subjects. Together, the two functions correctly classified 56% of the avoidant subjects, 51% of the anxious/ambivalent subjects, and 58% of the secure subjects. (The incorrectly classified subjects were distributed fairly evenly across the remaining categories.)

Correlations of the 22 predictor variables with the two dis-

Table 5
Significant Correlations Between Attachment-History Variables and Discriminant Functions (Newspaper Sample)

Variable	Function 1	Function 2
Affectionate parental relationship	.44*	
Respectful mother	.43*	.22
Intrusive mother	-.42*	
Caring father	.41*	
Demanding mother	-.40*	
Loving father	.40*	.25
Humorous father	.40*	
Confident mother	.35*	
Unhappy parental relationship	-.34*	.24
Accepting mother	.33*	
Caring parental relationship	.32*	
Responsible mother	.31*	
Affectionate father	.30*	.26
Sympathetic father	.28*	
Strong mother	.28*	
Disinterested mother	-.28*	
Unresponsive father	-.24*	
Unfair father	-.20	.47*
Humorous mother		.43*
Likable mother		.38*
Respected mother	.30	.37*
Rejecting mother	-.27	-.30*

Note. Correlations marked with an asterisk in the first column correlated more highly with Function 1 than with Function 2; the reverse is true in the second column.

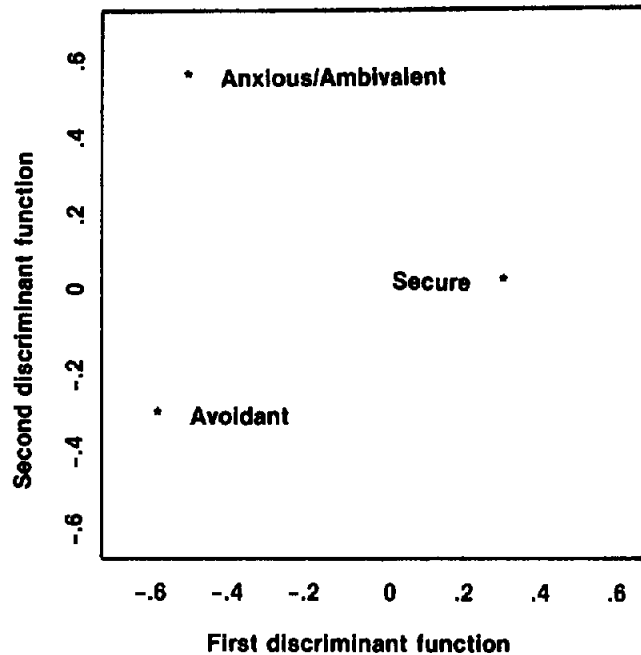


Figure 1. Plot of three group centroids on two discriminant functions derived from attachment-history variables (newspaper sample).

criminator functions are shown in Table 5. The best discriminators between secure and insecure subjects included (a) a relationship between parents that was affectionate ($r = .44$), caring (.32), and not unhappy ($-.34$); (b) a mother who was respectful of the subject (.43), confident (.35), accepting (.33), responsible (.31), not intrusive ($-.42$), and not demanding ($-.40$), among other qualities; and (c) a father who was, among other things, caring (.41), loving (.40), humorous (.40), and affectionate (.30). The top discriminators between avoidant and anxious/ambivalent groups, with positively correlated variables being those named more frequently by anxious/ambivalent subjects, included (a) no parental relationship variables; (b) a mother who was relatively humorous (.43), likable (.38), respected (.37), and not rejecting ($-.30$); and (c) a father who was relatively unfair (.47).

These results can be summarized by saying that secure subjects, in comparison with insecure subjects, reported warmer relationships with both parents and between their two parents. Avoidant subjects, in comparison with anxious/ambivalent subjects, described their mothers as cold and rejecting. Anxious/ambivalent subjects saw their fathers as unfair. Both sets of correlations are compatible with expectations based on Ainsworth et al.'s (1978) studies of infant-caregiver attachment.

Sex differences and similarities. There were a few significant sex differences on individual items. Most notably, respondents tended to describe their opposite-sex parent more favorably than their same-sex parent. For example, 62% of the women (vs. 44% of the men) described their fathers as loving, $t(563) = 4.16$, $p < .001$, and 78% of the men (vs. 69% of the women) described their mothers as loving, $t(614) = 2.36$, $p < .05$. This same pattern was found for the adjectives *affectionate* and *understanding*. Moreover, on negative trait dimensions, respondents tended

to judge their same-sex parent more harshly. For instance, 39% of the women, but only 27% of the men, described their mothers as critical, $t(614) = 2.91$, $p < .01$. When reporting about their fathers, on the other hand, 53% of the men chose *critical*, compared with 39% of the women, $t(563) = 3.06$, $p < .01$. The same was true for *demanding*. There were no significant sex differences in prevalence of the three attachment styles and only small differences on two of the love dimensions: Men agreed slightly more than women did with the sexual-attraction items (3.35 vs. 3.26), $t(618) = 1.99$, $p < .05$, and also reported greater desire for union (2.94 vs. 2.78), $t(616) = 2.45$, $p < .05$. Overall, what stood out was the marked similarity of the results for men and women.

Study 2

Method

Study 1 suffered from several limitations that made it desirable to conduct a conceptual replication. First, the newspaper sample might have been biased because of self-selection. This could have affected our estimate of the prevalence of each of the three attachment types and distorted other results in unanticipated and undetectable ways. It seemed wise, therefore, to test a non-self-selected college-student group in our second study, students being the usual subjects in social psychological research. Second, Study 1 examined only limited aspects of subjects' mental models. An interesting part of Bowlby's (1969) analysis was the claim that these models involve complementary portrayals of self and relationships. In Study 1, because of space limitations imposed by newspaper editors, we neglected the self side of subjects' mental models; in Study 2 we focused on them. Third, because previous research on loneliness (e.g., Rubenstein & Shaver, 1982) has linked loneliness to attachment history without using the attachment-classification item designed for our research on romantic love, we decided to include in Study 2 brief measures of state and trait loneliness (Shaver, Furman, & Buhrmester, 1985). The hypotheses were the same as in Study 1, but Hypotheses 4 and 5 were especially important in Study 2 because new self-model items and measures of loneliness were included.

Subjects. One hundred eight undergraduates (38 men and 70 women) who were enrolled in a course entitled Understanding Human Conflict completed the questionnaire as a class exercise. Approximately three fourths of the students were first-quarter freshmen; the mean age was 18 years.

Measures and procedure. As in Study 1, subjects were asked to describe their most important love relationship in terms of 56 agree-disagree items. They also classified themselves by using the same attachment-style item. To measure additional aspects of subjects' mental models, we included several self-descriptive items and some new items concerning relationships with other people (see Table 8). State and trait loneliness were measured (in a separate questionnaire to be described) with two parallel 11-item scales similar to those described by Shaver et al. (1985). These were based in part on the revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). Each item was answered on a 5-point response scale; trait items referred to feelings experienced "during the past few years" and state items referred to "the past few weeks." Sample trait items included "During the past few years, I have lacked companionship" and "During the past few years, about how often have you felt lonely?"

Subjects received their questionnaires as part of a series of class exercises due at different points during the quarter. Each exercise was due a week before related issues were discussed in class. Confidentiality was assured by checking off the names of students who handed in the exercise on time and then analyzing all data by number rather than by name.

Table 6
Love-Subscale Means for the Three Attachment
Types (Undergraduate Sample)

Scale name	Avoidant	Anxious/ ambivalent	Secure	F(2, 104)
Happiness	3.06	3.26	3.30	ns
Friendship	3.34 _a	3.39 _a	3.61 _b	3.30*
Trust	3.25 _a	3.35 _b	3.57 _b	3.03*
Fear of closeness	2.63 _a	2.45 _a	2.13 _b	4.48**
Acceptance	2.96	3.11	2.91	ns
Emotional extremes	2.79 _a	2.86 _a	2.33 _b	4.67**
Jealousy	2.52 _a	3.26 _b	2.40 _a	13.24***
Obsessive preoccupation	3.03	3.09	3.09	ns
Sexual attraction	3.05	3.31	3.23	ns
Desire for union	2.83 _a	3.29 _b	2.92 _a	3.41*
Desire for reciprocation	3.21 _a	3.64 _b	3.18 _a	7.50***
Love at first sight	2.67 _a	3.10 _b	2.83 _a	3.76*

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

To decrease possible halo effects, the loneliness questionnaire was administered 4 weeks after the love-quiz exercise was completed.

Results and Discussion

Frequencies of the three attachment styles. The proportions of each of the three attachment styles were highly similar in Study 2 to what they were in Study 1: secure, 56% (vs. 56% of newspaper respondents); avoidant, 23% (vs. 25%); and anxious/ambivalent, 20% (vs. 19%). It seems unlikely, therefore, that the newspaper sample was biased in this respect.

Differences in love experiences. The effects of attachment style on love experiences were also similar across the two studies, as seen by comparing Tables 3 and 6. Even though only 8 of the 12 subscales yielded significant mean differences with the smaller sample, nearly all exhibited the same pattern of means found in Study 1. Secure respondents characterized their love experiences as friendly, happy, and trusting, whereas avoidant subjects reported fear of closeness, and anxious/ambivalent subjects described relationships marked by jealousy, emotional highs and lows, and desire for reciprocation.

Differences in mental models (old items). As seen by comparing Tables 4 and 7, the results for six of the seven mental-model items used in Study 1 were replicated in Study 2, the exception being Item 3. (In Study 1, avoidant subjects were distinguishable by their denial that love can be rekindled after it wanes, but in Study 2 they were not.) However, only two of the items produced significant differences: Item 6 ("It's easy to fall in love. . ."; endorsed by 32% of the anxious/ambivalent, 15% of the secure, and none of the avoidant subjects) and Item 7 ("It's rare to find someone. . ."; endorsed by 80% of the avoidant, 55% of the secure, and 41% of the anxious/ambivalent subjects). One possible reason for differences between the two sets of re-

sults is that the college student subjects had less relationship experience; their average relationship had lasted about 1 year, compared with 8 years for the newspaper sample. Fewer of them were willing to say that Hollywood romance doesn't exist in real life (Item 1), more said that love doesn't fade over time (Item 4), and so on.

Differences in mental models (new items). Table 8 shows the proportion of each attachment group endorsing the new mental-model statements designed for Study 2. Attachment style had a significant effect on six of the eight, including all but one of the items concerning self. The secure subjects described themselves as easy to get to know and as liked by most people and endorsed the claim that other people are generally well-intentioned and good-hearted. The anxious/ambivalent subjects reported having more self-doubts, being misunderstood and underappreciated, and finding others less willing and able than they are to commit themselves to a relationship. The avoidant subjects generally fell between the extremes set by the secure and anxious/ambivalent subjects, and in most cases were closer

Table 7
Proportion of Respondents Who Endorsed Each Statement
About Love (Undergraduate Sample)

Statement	Avoidant	Anxious/ ambivalent	Secure	F Ratio (2, 104)
1. The kind of head-over-heels romantic love depicted in novels and movies doesn't exist in real life.	.16	.18	.12	ns
2. Intense romantic love is common at the beginning of a relationship, but it rarely lasts forever.	.40	.27	.17	ns
3. Romantic feelings wax and wane over the course of a relationship, but at times they can be as intense as they were at the start.	.64	.68	.50	ns
4. In some relationships, romantic love really lasts; it doesn't fade with time.	.56	.59	.77	ns
5. Most of us could love many different people equally well; there is no "one true love" which is "meant to be."	.28	.36	.28	ns
6. It's easy to fall in love. I feel myself beginning to fall in love often.	.00 _a	.32 _b	.15 _{ab}	4.96**
7. It's rare to find someone you can really fall in love with.	.80 _a	.41 _b	.55 _b	4.10*

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

* $p < .05$.

** $p < .01$.

Table 8
Proportion of Respondents Who Endorsed Each New Mental-Model Item (Undergraduate Sample)

Item	Avoidant	Anxious/ ambivalent	Secure	<i>F</i> (2, 104)
1. I am easier to get to know than most people.	.32 _a	.32 _a	.60 _b	4.39*
2. I have more self-doubts than most people.	.48 _a	.64 _a	.18 _b	9.96***
3. People almost always like me.	.36 _a	.41 _a	.68 _b	5.19**
4. People often misunderstand me or fail to appreciate me.	.36 _a	.50 _a	.18 _b	4.56*
5. Few people are as willing and able as I am to commit themselves to a long-term relationship.	.24 _a	.59 _b	.23 _a	5.57**
6. People are generally well-intentioned and good-hearted.	.44 _a	.32 _a	.72 _b	6.99***
7. You have to watch out in dealing with most people; they will hurt, ignore, or reject you if it suits their purposes.	.32	.32	.15	<i>ns</i>
8. I am more independent and self-sufficient than most people; I can get along quite well by myself.	.80	.59	.68	<i>ns</i>

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

to the anxious/ambivalent than to the secure. Although the differences on the last two items did not reach significance, the means were ordered in theoretically meaningful ways. The two insecure groups more often said that one has to "watch out in dealing with most people," and more of the avoidant subjects (80%) than of the secure (68%) or anxious/ambivalent (59%) subjects agreed that "I can get along quite well by myself."

Differences in attachment history. In an attempt to replicate the attachment-history findings of Study 1 using data from Study 2, we again performed a hierarchical discriminant-function analysis. Subjects with no missing data on the variables involved ($N = 101$) were included in the analysis. Once again, both functions proved to be statistically significant, with a combined $\chi^2(50, N = 101) = 128.30, p < .001$. After removal of the first function, $\chi^2(24, N = 101)$ was 39.84 ($p < .05$). The two functions accounted for 75.31% and 24.69%, respectively, of the between-groups variability. As shown in the upper panel of Figure 2, the first discriminant function separated anxious/ambivalent subjects from the other two attachment groups, a pattern different from that obtained in Study 1. The second function separated avoidant from secure subjects. Together, the two functions correctly classified 75.0% of the avoidant subjects, 90.5%

of the anxious/ambivalent subjects, and 85.7% of the secure subjects.

The new pattern was due primarily to the fact that avoidant subjects in Study 2 described their attachment histories as more similar to those of secure subjects on positive trait dimensions

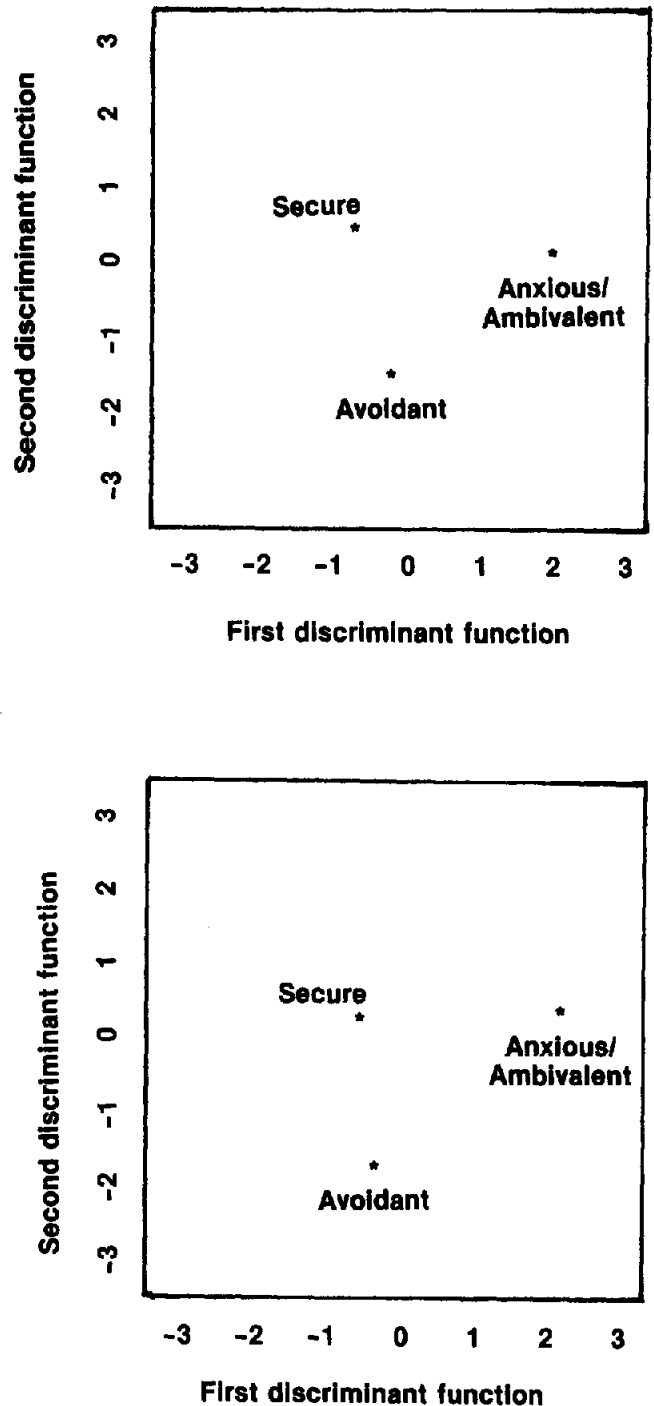


Figure 2. Plots of three group centroids on two discriminant functions derived from attachment-history variables. (The upper portion of the figure displays results for Study 2; the lower portion, results from newspaper respondents below 26 years of age.)

Table 9
Significant Correlations Between Attachment-History Variables and Discriminant Functions (Undergraduate Sample)

Variable	Function 1	Function 2
Cold father	.25*	
Caring father	-.24*	
Confident father	-.23*	
Understanding mother	-.22*	
Humorous father	-.21*	
Warm father	-.18*	
Respectful father	-.17*	
Good-humored parental relationship	-.16*	
Rejecting mother		-.42*
Confident mother		.31*
Respectful mother		.21*
Fair father		.19*
Critical mother		-.19*
Disinterested mother		-.18*
Accepting mother		.17*
Insecure mother		-.17*
Cold mother		-.16*

Note. Correlations marked with asterisks in the first column correlated more highly with Function 1 than with Function 2; the reverse is true in the second column.

than did avoidant subjects in Study 1. In Study 1, for example, only 12% of avoidant subjects said their mother had been accepting; in Study 2 this figure jumped to 50%. For *sympathetic*, the figure jumped from 32% to 79%. The same kinds of differences were evident in descriptions of the relationship with father and the parental relationship. For example, 29% of avoidant subjects in Study 1 described their parents' relationship as happy; the corresponding figure in Study 2 was 63%. For *good-humored*, the percentage increased from 19 to 54. This tendency toward more favorable descriptions on the part of Study 2's avoidant subjects resulted in greater apparent similarity to the secure subjects; on several items, in fact, slightly more avoidant than secure subjects gave their parents favorable reports. This did not keep them, however, from also mentioning more negative descriptors, such as *critical*, *rejecting*, and *disinterested*. These negative descriptors allowed the second discriminant function to distinguish between secure and avoidant groups.

Correlations between the 17 significant predictor variables with coefficients above .15 and the two discriminant functions are shown in Table 9. The best discriminators between anxious/ambivalent subjects and secure subjects were (a) a relationship between parents that was perceived not to be good-humored (-.16), (b) a mother who was not understanding (-.22), and (c) a father who was cold (.25), not caring (-.24), and not confident (-.23). In contrast to avoidant subjects, secure subjects described their mothers as respectful (.21), accepting (.17), not rejecting (-.42), and not critical (-.19), and their fathers as fair (.19).

Why should avoidant subjects' attachment histories appear more similar to secure subjects' attachment histories in the younger (college student) sample? Central to avoidant attachment is defensiveness. Main et al. (1985) and Kobak and Sceery

(in press) have shown that avoidant adults and college students tend to idealize their relationships with parents to avoid the negative feelings associated with those relationships. Evidently, it is only with maturity and distance from parents that an avoidant person can begin to acknowledge severely negative aspects of his or her early relationships. To test the hypothesis that youth is an important factor, we performed a third discriminant-function analysis, using data from the 100 youngest newspaper respondents (all under 26 years of age). The pattern of results proved to be highly similar to the results from Study 2, as seen by comparing the upper and lower panels of Figure 2. There were two statistically significant discriminant functions, and, as in Study 2, the first distinguished primarily between anxious/ambivalent subjects and the other two groups. The second function distinguished primarily between avoidant and secure subjects.

As a further test of whether differences were due to younger avoidant subjects describing their attachment histories more favorably than did older avoidant subjects, we compared the means on attachment variables for young (again, under 26 years of age) with those of older newspaper subjects who had classified themselves as avoidant. We found that more younger than older avoidant subjects described relationships with and between their parents in favorable terms. For example, more described their mothers as loving (.77 vs. .57), $t(51) = 2.15$, $p < .05$. They were also significantly ($p < .05$) more likely to say their mothers were responsive, not intrusive, and not rejecting. The same pattern was found in their descriptions of their fathers. For example, 65% of the young avoidants but only 54% of the older group called their fathers loving, $t(157) = 2.13$, $p < .05$, and they described their fathers as significantly more good-humored. Thus, differences between discriminant-function analyses from the two studies seem to be due to age differences between the two samples and the tendency for young avoidant subjects to idealize their attachment histories.

Differences in state and trait loneliness. Finally, Table 10 reports mean trait- and state-loneliness scores (on 5-point scales) for each of the three attachment groups in Study 2. In line with Hypothesis 5, the highest scores were obtained by the anxious/ambivalent subjects and the lowest scores by the secure subjects. These findings fit with other indications throughout the two studies that anxious/ambivalent adults yearn for a love relationship involving merger, reciprocation, and intense passion—a relationship for which they find too few willing partners.

In an attempt to understand why avoidant subjects did not receive trait-loneliness scores equal to those of anxious/ambiva-

Table 10
Trait and State Loneliness as a Function of Adult Attachment Style (Undergraduate Sample)

Loneliness type	Avoidant	Anxious/ambivalent	Secure	$F(2, 104)$	p
Trait	2.30 _{ab}	2.59 _a	2.01 _b	7.12	.001
State	2.57 _{ab}	3.02 _a	2.21 _b	6.43	.003

Note. Within each row, means with different subscripts differ at the .05 level of significance according to a Scheffé test.

lent subjects, we looked at individual items, including some extreme ones not included in the two scales. (The extra items were taken from the NYU Loneliness Scale; Rubenstein & Shaver, 1982.) Two kinds of items were of special interest: one that blatantly emphasized being a lonely person (e.g., "I am a lonely person," "I always was a lonely person") and another that referred to distance from others but without indicating that a lonely self was to blame (e.g., "During the past few years, no one has really known me well," "During the past few years, I have felt left out").

In an exploratory analysis, two items of each type were averaged and contrasted by means of planned comparisons. The comparison of anxious/ambivalent subjects and the other two groups on items that implicated a trait-lonely self produced $F(1, 80) = 17.88, p < .001$; the comparison of secure and insecure groups on the more ambiguous items produced $F(1, 80) = 7.05, p < .01$. No other comparisons were significant.

These exploratory analyses are compatible with findings reported by Kobak (1985). In his study, both avoidant and anxious/ambivalent subjects were rated by peers as less socially competent than secure subjects, but when asked to describe themselves, only the anxious/ambivalent subjects reported less social competence.

Sex differences and similarities. In Study 2 there were no significant sex differences in any of the variables or patterns for which we had sufficient numbers of men to make comparisons.

General Discussion

Five hypotheses concerning adult love and loneliness were derived from attachment theory and research. The first was the simplest prediction we could make regarding the relative frequencies of the three attachment styles: that they would be about as common in adulthood as they are in infancy. The results supported this hypothesis. Across both studies, approximately 56% of the subjects classified themselves as secure, approximately 24% as avoidant, and approximately 20% as anxious/ambivalent. Campos et al. (1983) estimated the figures for infancy as 62% secure, 23% avoidant, and 15% anxious/ambivalent. Of course, it is unlikely that our single-item measure of attachment style measures exactly the same thing that Ainsworth et al. (1978) coded from behavioral observations of infant-mother dyads, and it would be naive to think that a style adopted in infancy remains unchanged or unelaborated all through life. Still, the search for connections between attachment in childhood and attachment in adulthood must begin somewhere, and our simple measure and straightforward hypothesis fared surprisingly well in their initial tests.

The second hypothesis predicted different kinds of love experiences for people in the three attachment-style categories. The data supported this hypothesis, indicating a unique constellation of emotions for each of the three attachment categories despite the existence of a general core experience of romantic love. The results were weaker in Study 2 than in Study 1, partly because of sample size but also, perhaps, because of younger subjects' lack of relationship experience.

The third hypothesis predicted that subjects' working models of self and relationships would be related to attachment style. The results supported this prediction, indicating that people

with different attachment orientations entertain different beliefs about the course of romantic love, the availability and trustworthiness of love partners, and their own love-worthiness. These beliefs may be part of a cycle (a vicious cycle in the case of insecure people) in which experience affects beliefs about self and others and these beliefs in turn affect behavior and relationship outcomes (Wachtel, 1977).

The fourth hypothesis, like the first, predicted straightforward parallels between infant-mother interactions and adults' reports about their childhood relationships with parents. Simple adjective checklists were used to assess remembered relationships with parents and the parents' relationship with each other. Study 1 indicated that two discriminant functions based on attachment-history items could distinguish significantly between members of the three attachment categories. The most powerful function discriminated between secure and insecure subjects; the second function discriminated mainly between the two insecure groups. These results fit well with Ainsworth et al.'s (1978) findings.

The results were not so straightforward for Study 2, which involved a younger group of subjects. For them, the easiest attachment styles to distinguish, based on reports about childhood experiences with parents, were anxious/ambivalent on the one hand and avoidant and secure on the other. A second function discriminated mainly between the latter two groups. The differences between Study 1 and Study 2 were interpreted in terms of the defensiveness of young avoidant subjects. An analysis distinguishing younger from older subjects in Study 1 supported this interpretation.

The fifth hypothesis predicted greater reported trait loneliness among insecure than secure subjects, especially among the anxious/ambivalents. This prediction was tested in Study 2 and was supported by measures of both trait and state loneliness. Additional analyses revealed that avoidant subjects admitted being distant from other people but did not report feeling lonely. It was impossible to evaluate their claims more deeply to see whether they are accurate or should be interpreted as additional examples of defensive avoidance.

Overall, the results provide encouraging support for an attachment-theoretical perspective on romantic love, although a number of caveats are in order.

Because the Study 1 and Study 2 questionnaires had to be brief (one due to the constraints of newspaper space, the other to limitations of a class-exercise format), we were able to inquire about only a single romantic relationship—the one that each subject considered most important. To increase the chances of detecting features of relationship experience due to subjects' attachment styles, it would be better to ask about more than one relationship. Hindy and Schwarz (1984) questioned their subjects (all recent college graduates) about four relationships and treated these as items on an anxious-attachment measure. They found correlations in the neighborhood of .40 between each pair of relationships in terms of anxious attachment, suggesting both considerable continuity (due, we suspect, to subjects' attachment style) and considerable variation across relationships. Degree of security or anxiety in a relationship is, as one would expect, a joint function of attachment style and factors unique to particular partners and circumstances. This matter obviously deserves further study.

It may be useful to assess both partners in a relationship; so far, we and Hindy and Schwarz have relied on reports from only one. It should be possible, using methods like those of Gottman (1979) and Gottman, Markman, and Notarius (1977), to examine not only reports about relationship qualities but also observable features of couple interaction in the laboratory. This is one way to extend measurement beyond the realm of self-report.

In general, we have probably overemphasized the degree to which attachment style and attachment-related feelings are traits rather than products of unique person-situation interactions. Attachment researchers often vacillate between using the terms *secure*, *avoidant*, and *anxious/ambivalent* to describe relationships and using them to categorize people. We have focused here on personal continuity, but we do not wish to deny that relationships are complex, powerful phenomena with causal effects beyond those predictable from personality variables alone. A secure person trying to build a relationship with an anxious/ambivalent person might be pushed to feel and act avoidant. An avoidant person might cause a secure partner to feel and act anxious, and so on. These kinds of interactions deserve study in their own right.

Our measures were limited in terms of number of items and simplicity of answer alternatives, and this should be corrected in future work. However, there are reasons to suspect that no amount of psychometric improvement will solve all the problems associated with self-report assessment of attachment-related variables. First of all, subjects may be unable to articulate exactly how they feel in love relationships. Second, subjects are unlikely to have anything like perfect memory for their love experiences or for the nature of their relationships with parents, especially those during the preschool years. Third, subjects are likely to be defensive and self-serving in their recall and description of some of the events we wish to inquire about.

One way around some of the problems with self-report measures is to ask outsiders to describe subjects' relationship-relevant characteristics. Kobak and Sceery (in press) did so in a recent study of attachment styles of college freshmen. They had two acquaintances of each subject describe him or her by using a Q-sort procedure, and the two sets of results were averaged. Subjects' attachment styles were assessed by a long clinical interview designed by George, Kaplan, and Main (1984). The results indicated that secure subjects were described by acquaintances as more socially competent, charming, cheerful, and likable than their avoidant and anxious/ambivalent classmates. The two insecure groups differed in theoretically expected ways, the avoidant group being described as more hostile and defensive, for example, and the anxious/ambivalent group as more self-conscious and preoccupied with relationship issues.

The attachment interview designed by George et al. (1984) is itself an important alternative to the kinds of self-report measures we used because it includes assessments of defensiveness, apparently blocked memories of important relational episodes with parents, and preoccupation with attachment issues (on the part of anxious/ambivalent subjects). In fact, focusing on defensiveness and information-processing style led Main et al. (1985) to conceptualize mental models somewhat differently than we did. Whereas we attempted to assess consciously held beliefs

about self and relationships, Main et al. attempted to assess how information is processed and distorted.

Even within the self-report domain, it should be possible to improve on our single-item measure of attachment style. Each of our answer alternatives included more than one issue or dimension, for example, ease of getting close to others, feeling comfortable with caregiving and care receiving, fear of abandonment. In principle, each such issue could be assessed separately, with a multi-item scale, and then attachment types could be derived by profile analysis. Besides being potentially more reliable, such a method would allow subjects to endorse parts of what is currently forced on them as a single alternative.

Aside from measurement problems, the attachment approach to romantic love must overcome important conceptual dilemmas. In our preliminary studies, we have chosen to overlook the fact that child-parent relationships differ in important ways from adult romantic relationships. One of the most important differences is that romantic love is usually a two-way street; both partners are sometimes anxious and security-seeking and at other times able providers of security and care. A second important difference is that romantic love almost always involves sexual attraction (Tennov, 1979), whereas only the most speculative psychoanalysts have claimed that infants' attachments to the mother are sexual in nature. Bowlby (1979) and Ainsworth et al. (1978), taking their cue from ethology, have dealt with problems such as these by postulating distinct behavioral systems. These include, among others, the attachment system, the caregiving system, and the mating or reproductive system. Adult romantic love seems to involve the integration of these three systems, with the form of the integration being influenced by attachment history (Shaver et al., in press).

Another important issue has to do with continuity and change in attachment style. For theoretical reasons, we were interested in examining evidence for continuity of attachment style between childhood and adulthood, and we consider it important that there is good evidence for continuity between ages 1 and 6 and preliminary retrospective evidence for continuity in our own adult data. Nevertheless, it would be overly pessimistic—from the perspective of insecurely attached people—to conclude that continuity is the rule rather than the exception between early childhood and adulthood. The correlations we obtained between parent variables and current attachment type were statistically significant but not strong. They were higher in Study 2, where the average subject was 15 to 20 years younger than in Study 1. (Also, when we divided the newspaper sample into younger and older age groups in an analysis not reported here, correlations with parent variables were higher for the younger group.) It seems likely that continuity between childhood and adult experiences decreases as one gets further into adulthood. (See Skolnick, in press, for relevant longitudinal evidence.) The average person participates in several important friendships and love relationships, each of which provides an opportunity to revise mental models of self and others.

Main et al. (1985) reported that, despite an impressive association between adults' attachment history and the attachment styles of their own young children, some parents had freed themselves from the chain of cross-generational continuity. That is, some adults who reported being insecure in their relationships with parents managed to produce children who were

securely attached at ages 1 and 6. Careful study of these cases suggested to Main et al. that the adults had mentally worked through their unpleasant experiences with parents and now had mental models of relationships more typical of secure subjects. The process by which an insecure person becomes increasingly secure, probably by participating in relationships that disconfirm negative features of experience-based mental models, offers an important avenue for future research. Our results suggest that younger avoidant adults are especially prone to defensive distortion of memories of relationships with and between parents. Older avoidant subjects presented a much less favorable portrait of their parents.

Because many social psychologists are likely to misread our approach as Freudian, it may be worthwhile to contrast Freudian conceptions of infant-to-adult continuity on the one hand with attachment theory's conception on the other. Unlike the Freudian conception, according to which the supposed irrationalities of adult love indicate regression to infancy or fixation at some earlier stage of psychosexual development, attachment theory includes the idea that social development involves the continual construction, revision, integration, and abstraction of mental models. This idea, which is similar to the notion of scripts and schemas in cognitive social psychology (e.g., Fiske & Taylor, 1984), is compatible with the possibility of change based on new information and experiences, although change may become more difficult with repeated, uncorrected use of habitual models or schemas.

Freud argued his case beautifully, if not persuasively, by likening the unconscious to the city of Rome, which has been ravaged, revised, and rebuilt many times over the centuries. In the case of the unconscious, according to Freud, it is as if all the previous cities still exist, in their original form and on the same site. Bowlby's conception is more in line with actual archeology. The foundations and present shapes of mental models of self and social life still bear similarities and connections to their predecessors—some of the important historical landmarks, bridges, and crooked streets are still there. But few of the ancient structures exist unaltered or in mental isolation, so simple regression and fixation are unlikely.

The attachment-theory approach to romantic love suggests that love is a biological as well as a social process, based in the nervous system and serving one or more important functions. This view runs counter to the increasingly popular idea that romantic love is a historical-cultural invention, perhaps a creation of courtly lovers in 13th-century Europe (e.g., Averill, 1985; de Rougement, 1940). This is obviously a matter for serious cross-cultural and historical research, but in the absence of strong evidence to the contrary, we hypothesize that romantic love has always and everywhere existed as a biological potential, although it has often been precluded as a basis for marriage. There are explicit records of romantic love in all of the great literate civilizations of early historic times, from Egypt and China to Greece and Rome (Mellen, 1981).

Finally, we should make clear that by calling romantic love an attachment process we do not mean to imply that the early phase of romance is equivalent to being attached. Our idea, which requires further development, is that romantic love is a biological process designed by evolution to facilitate attachment between adult sexual partners who, at the time love

evolved, were likely to become parents of an infant who would need their reliable care.

The noticeable decrease in fascination and preoccupation as lovers move from the romantic (attaching) phase to what can become a decades-long period of secure attachment is evident not only in the case of romantic love but also in early childhood, when most secure children begin to take parental support for granted (barring unexpected separations). As Berscheid (1983) has shown in her analysis of the apparent unemotionality of many marriages, disruptions such as divorce and widowhood often "activate the attachment system," to use Bowlby's phrase, and reveal the strength of attachment bonds that were previously invisible. Loneliness and grieving are often signs of the depth of broken attachments.

In sum, love and loneliness are emotional processes that serve biological functions. Attachment theory portrays them in that light and urges us to go beyond simpler and less theoretically integrative models involving concepts such as attitude (e.g., Rubin, 1973) and physiological arousal (Berscheid & Walster, 1974). For that reason, the attachment approach seems worth pursuing even if future study reveals (as it almost certainly will) that adult romantic love requires additions to or alterations in attachment theory. It would not be surprising to find that adult love is more complex than infant-caregiver attachment, despite fundamental similarities.

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Received March 5, 1986

Revision received October 8, 1986 ■

December 2004

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Pathways to Self-Esteem in Late Adolescence: The Role of Parent and Peer Attachment, Empathy, and Social Behaviors

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Abstract

The goal of this study was to examine both the direct and indirect relations of parent and peer attachment with self-esteem and to examine the potential mediating roles of empathy and social behavior. 246 college students (*M*_{age} = 18.6 years, *s.d.* = 1.61) completed self-report measures of parent and peer attachment, empathy, social behavior, and self-esteem. Structural equation modelling revealed that parental attachment had mostly direct effects on self-esteem. Among females, the links between peer attachment and self-esteem, however, were entirely mediated by empathy and prosocial behavior. The findings from this study suggest that although close supportive relationships with parents and peers are related to adolescent self-esteem, these links are complex.

Introduction

Throughout adolescence, children decreasingly rely on parents as attachment figures and increasingly turn to peers and romantic partners for attachment related functions, such as seeking comfort in times of stress (Allen & Land, 1999; Carlo, Fabes, Laible, & Kupanoff, 1999; Fraley & Davis, 1997). It is important to realize, however, that decreased dependence on parents does not mean that attachment relationships with parents are any less important or any less predictive of adolescent outcomes. In fact, attachment security with parents continues to predict aspects of

psychosocial well-being even into young adulthood (Fraley & Davis, 1997; Larson, Richards, Moneta, Holmbeck & Duckett, 1996).

Indeed, secure attachments with parents in adolescence may be especially important for fostering identity and self-development during adolescence (Allen & Land, 1999). Although adolescence is a time of increasing autonomy from parents, researchers now believe that this autonomy is most readily established not at the expense of strong relationships with parents, but in the context of secure relationships with parents (Allen, Hauser, Bell, & O'Connor, 1994). Thus, researchers have argued that secure attachments provide adolescents with a "secure base" from which to explore identity issues and promote aspects of self-development, especially self-esteem (see e.g., Allen & Land, 1999).

According to attachment theory, children begin to construct rudimentary models of the self (and others) in response to the availability and sensitivity of caregivers in toddlerhood and these representations are reworked across the lifespan (Bowlby, 1982; Bretherton, 1991). Thus, if caregivers have been sensitive and available to the child, a child constructs a model of the self as worthy and deserving of love. In contrast, if parents have failed to be sensitive and accessible, a child constructs models of the self as unworthy and undeserving of love. Fering and Taska (1996) have argued that warm and positive interactions between attachment figures and children foster positive representations of the self not just within the family context, but in more global self-evaluation contexts as well. Research generally supports the view that secure attachments with parents in infancy, childhood, and adolescence are linked with positive representations of the self, including high levels of self-esteem and self-efficacy (Arbona & Power, 2003; Thompson, 1999, for review). Similarly, research outside the field of attachment typically finds strong links between warm and supportive parenting practices and high levels of self-esteem in adolescence and young adulthood (Harter, 1990; Lamborn, Mounts, Steinberg, & Dornbusch, 1991).

In addition to parents, peers also serve as important and influential attachment figures for adolescents (Burhmester, 1992, Carlo et al., 1999). Although controversy exists on whether peers can in fact be considered attachment figures (see e.g., Ainsworth, 1991), peers begin to serve many of the same attachment needs as parents by middle to late adolescence (Burhmester, 1992). For example, peers become sources of emotional support and comfort, serve as safe havens and secure bases, and even become sources of separation distress (Hazan & Zeifman, 1999). Furthermore, by middle adolescence peers may allow for adolescents' attachment needs to be met at a time when they are struggling to establish some autonomy from parents. As a result, many researchers do in fact consider that peers, and ultimately romantic partners, can become attachment figures in adolescence (see e.g., Allen & Land, 1999; Furman, Simon, Shaffer, & Bouchey, 2002; Hazan & Zeifman, 1999).

Just as with parents, secure attachments with peers are likely important for an adolescent's self development and for shaping an adolescent's global self-esteem (Black & McCartney, 1997; Fass & Tubman, 2002; Hoffman, Levy-Shiff, & Ushpiz, 1993). It is not clear, however, how both peer and parent attachment relationships become integrated into an adolescent's internal working model of the self, especially when experiences with parents and peers are highly divergent. Although researchers find moderate to strong correlations between parent and peer attachment (see e.g., Laible, Carlo, & Raffaelli, 2000), for a moderate percentage of adolescents, these experiences may be divergent (see e.g., Furman et al., 2002).

Some theorists (e.g., Bretherton, 1985) have argued for a hierarchical organization of internal working models in which the child's representation of the most salient attachment figure is the most influential and therefore the most predictive of developmental outcomes. This issue might be complicated by the fact that the most influential attachment figure in an adolescent's model of self might change across development, as peers or romantic partners become important as attachment figures (Laible et al., 2000). However, this point remains empirically unexamined. Other scholars, however, have argued that multiple attachment relationships are not integrated, but instead form multiple independent internal working models that are influential in different developmental domains (e.g., Suess, Grossman, & Sroufe, 1992). Research examining this issue is mixed (see Howes, 1999) and therefore it is not clear how multiple relationships are represented by an adolescent in his/her working models of the self.

The present study

Regardless, as previously discussed, both peer and parent attachment security should be related to an adolescent's feelings of self-worth and research supports this idea (Armsden & Greenberg, 1987; Hoffman et al., 1993). What is not necessarily clear is whether parent and peer attachment exert solely direct effects on self-esteem or whether these effects are mediated through the adolescent's social behaviors, such as aggression and prosocial behavior (Carlo, Raffaelli, Laible, & Meyer, 1999). In fact, the model that we propose in Figure 1 posits both direct and indirect influences of peer and parent attachment on adolescent self-esteem. The direct paths suggest that secure attachment relationships with parents and peers promote feelings of self-worth. However, we also propose that parent and peer attachment have indirect influences on self-esteem through empathy and social behaviors (see Figure 1). Secure attachments with parents and peers likely foster high levels of empathy and appropriate social behaviors, which in turn have been linked with high levels of self-esteem.

The indirect paths: empathy and social behaviors

Researchers have speculated and found empirical support for the idea that warm, nurturing relationships with parents in adolescence promotes prosocial behavior and decreases aggressive

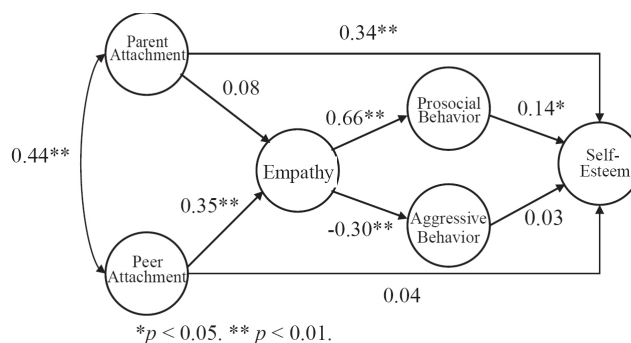


Figure 1. Hypothetical relations among the variables. Actual relations among the variables with the full sample ($N = 246$). Please note that the measurement model is omitted for clarity.

behavior (see Coie & Dodge, 1998, Eisenberg & Fabes, 1998, for reviews). The relations between parent-child attachment and positive and negative social behaviors are likely mediated by the development of empathy (Eisenberg & Fabes, 1998; Eisenberg & McNally, 1993; Hawkins & Lishner, 1987). Empathy is an other-oriented vicariously induced emotion that is presumed to foster positive social behaviors and inhibit aggressive behaviors, because those who experience this emotion are motivated to reduce the distress of others (Batson, 1991; Eisenberg & Fabes, 1998; Murphy, Shepard, Eisenberg, Fabes, & Guthrie, 1999). Researchers have argued that warm, supportive parenting inherent in secure parent-adolescent relationships creates an affective climate in the home that fosters the development of empathy and reciprocity (Garber, Robinson, & Valentiner, 1997; Zahn-Waxler & Radke-Yarrow, 1990).

Researchers have also argued that peer relationships might provide a unique opportunity in which to develop empathy, and thus enhance the development of prosocial behavior and limit the development of aggressive behavior (Eisenberg & Fabes, 1998). These theorists argue that peer relationships, unlike parent-child relationships, provide unique equality, mutuality, and reciprocity (Youniss, 1985) and that these qualities provide rich opportunities for the development of perspective taking and empathy. Despite this, however, researchers have not generally examined how the quality or security of adolescent peer relationships is related to an adolescent's level of empathy. The limited research that is available, however, suggests that the security of attachment of adolescents to their peers may be more predictive of adolescents' reports of empathy than is security of attachment to parents (Laible et al., 2000).

Social behaviors such as aggression and prosocial behavior have been theoretically and empirically linked with self-esteem in childhood and adolescence. With respect to prosocial behavior, researchers have speculated that the relationship between self-esteem and prosocial behavior is likely bi-directional. Adolescents with high levels of self-esteem feel more competent to assist others in need and are also more able to do so than adolescents who are low in self-esteem, because their own needs are being met (Eisenberg & Fabes, 1998). However, it also seems likely that an adolescent's engagement in prosocial and positive social activities increases their self-esteem (Yates & Youniss, 1996). Researchers have found a moderate relation between self-esteem and prosocial behavior in elementary school children (Larrieu & Mussen, 1986), but research with adolescents is lacking (see Eisenberg & Fabes, 1998).

Similarly, researchers have found links between aggression and self-esteem in adolescents and adults, although these links have not always been consistent (Baumeister, Bushman, & Campbell, 2000). Although aggression tends to have many causes, individuals with low self-esteem seem to be at risk for engaging in aggressive and antisocial behavior (see e.g., Lochman & Lampron, 1986; Lowenstein, 1989; Paulson, Coombs, & Landsverk, 1990; Russell & Hudson, 1992). The question remains, however, whether low self-esteem causes aggressive behavior or whether the opposite is true, i.e., aggressive behavior leads to feelings of inadequacy and low self-esteem, particularly as a result of peer rejection (Lcary, Schreindorfer, & Haupt, 1995).

Hypotheses

The goal of this study was to examine the direct and indirect effects of parent and peer attachment on self-esteem in late adolescence, taking into account the possible mediating roles of empathy, aggression, and prosocial behavior (see Figure 1). Overall, research suggests that parent

attachment is more strongly related to high levels of self-esteem among adolescents than is peer attachment (see e.g., Paterson, Pryor, & Field, 1995). However, part of the reason for this difference may be that peer attachment has more indirect effects on adolescent self-esteem through its unique influence on the development of empathy and social behaviors. Therefore, it was expected that secure attachments to parents would have relatively direct influences on self-esteem, although this did not preclude the possibility that parent attachment might also have some indirect effects through its relations with empathy and social behaviors. In contrast, it was expected that peer attachment would have mostly indirect effects on self-esteem through empathy and social behaviors (although we certainly did not rule out the possibility that peer attachment would also have direct effects on self-esteem).

Method

Participants and procedures

Participants in the study were 246 college students (M age = 18.6 years, $s.d.$ = 1.61) who were enrolled in undergraduate psychology courses in a large state university in the South. The sample was ethnically diverse (15% Caucasian, 13% African-American, 59% Latino) and predominately female (70%). Participants received extra credit for their participation in the study and questionnaires were administered to small groups of adolescents.

Measures

The surveys consisted of a number of demographic items and a battery of self-report scales. All of the scales in this study had been previously used and validated with older adolescents. The survey included the following scales (in addition to a number of demographic items):

Parent and Peer Attachment. Students completed a shortened version of the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987). The original scale was developed and tested with adolescents and was designed to assess both the affective and cognitive dimensions of *current* attachment security and trust in the accessibility and responsiveness of attachment figures. Both the shortened parent and peer scales consisted of 12 items, four from each of the three original subscales, i.e., trust, communication, and alienation. Parallel peer and parent items were chosen (sample item, "My parent respects my feelings", "my friends respect my feelings"). Both scales were rated on a 5-point scale from "never" to "always". Previous research has documented the predictive validity of the shortened measure (see e.g., Laible et al., 2000). For the parent scale, participants were instructed that if they had a different relationship with their mother and father, they should respond to the items for the parent who most influenced them. For peers, adolescents were instructed to respond to the items for the group of friends who they felt most influenced them. Internal consistency on the scales was adequate ($\alpha_{\text{parent}} = 0.89$, $\alpha_{\text{peer}} = 0.78$).

Empathy. Students completed the empathic concern and perspective taking subscales from the Interpersonal Reactivity Questionnaire (Davis, 1983). Both the empathic concern scale ($\alpha = 0.61$ in the present study) (sample item, "I often have tender, concerned feelings for people less fortunate than me") and the perspective taking scale ($\alpha = 0.63$ in the present study) (sample item, "I some-

times find it difficult to see things from the 'other person's point of view', reverse coded) consisted of seven items. Both scales were rated on a 5-point scale ranging from "does not describe me" to "describes me very well."

Because perspective taking and empathic concern are theoretically and empirically related (Davis, 1983), an empathy scale was formed by combining the two scales. Preliminary correlational analysis indicated that the empathic concern and perspective taking scales were significantly interrelated [$r(245) = 0.35, p < 0.001$]. Following previous researchers (e.g., Laible et al., 2000; Carlo, Roesch, & Melby, 1998) the two scales were averaged to form the empathy scale ($\alpha = 0.78$ in the present study).

Aggression. Aggression was measured using the Suppression of Aggression subscale from the Weinberger Adjustment Inventory (Weinberger, 1991). The Suppression of Aggression scale was rated on a 5-point scale that ranged from 1 (does not describe me) to 5 (describes me very well) and consisted of five items (sample item, "I lose my temper and 'let people have it' when I'm angry"). Internal consistency of the scale was adequate ($\alpha = 0.78$) and higher scores indicated more aggression.

Prosocial behavior. Participants also completed a 20-item measure designed to provide a global index of prosocial responding (Rushton, Chrisjohn, & Fekken, 1981). Students were asked to rate the frequency of various behaviors on a 5-point scale ranging from 1 (never) to 5 (very often). Internal consistency of the measure was adequate ($\alpha = 0.73$; sample item, "I have comforted someone who was very upset").

Self-esteem. The Rosenberg self-esteem scale (Rosenberg, 1965) was used as a measure of adolescent self-esteem. The scale contains 10 items that were rated on a 5-point scale from "strongly disagree" to "strongly agree". Reliability was adequate ($\alpha = 0.73$; sample item, "On the whole, I am satisfied with myself").

Results

Descriptive and bivariate data

Descriptive data on all of the variables and the bivariate relations among the variables appear in Table 1. Bivariate relations revealed a significant correlation between parent and peer attach-

Table 1. Descriptive statistics and bivariate relations among the attachment, empathy, and social behaviors

	1	2	3	4	5	6	Mean	Standard deviation
1. Parent attachment	—	0.40**	0.21**	0.21**	-0.07	0.33**	3.63	0.72
2. Peer attachment		—	0.28**	0.23**	-0.08	0.20**	3.91	0.48
3. Empathy			—	0.46**	-0.32**	0.11	3.75	0.53
4. Prosocial behavior				—	-0.21**	0.20**	2.40	0.80
5. Aggression					—	-0.01	3.38	0.56
6. Self-esteem						—	3.68	0.40

* $p < 0.05$, ** $p < 0.01$.

ment. Adolescents who reported a secure attachment with parents also reported a secure attachment with peers. Attachment security with both parents and peers was similarly related to adolescent reports of empathy, prosocial behavior, and self-esteem. Adolescents who reported secure attachments to parents and/or peers reported high levels of empathy, prosocial behavior, and self-esteem. Furthermore, adolescent reports of empathy were also significantly correlated with their reports of aggression and prosocial behavior. Adolescents who reported high levels of empathy also reported engaging in high levels of prosocial behavior and low levels of aggressive behavior. Finally, prosocial behavior was significantly correlated with aggressive behavior and self-esteem. Adolescents with high levels of prosocial behavior reported having high levels of self-esteem and low levels of aggressive behavior.

Gender differences

To examine gender differences, a series of independent *t*-tests was conducted. Although males and females did not differ with regards to parent attachment, they did differ on peer attachment with females reporting higher levels of peer attachment ($M_{females} = 3.96$, $s.d. = 0.48$; $M_{males} = 3.79$; $s.d. = 0.48$; $t(2\ 4\ 5) = -2.50$, $p < 0.05$). In addition, females reported higher levels of empathy ($M_{females} = 3.84$, $s.d. = 0.51$; $M_{males} = 3.51$; $s.d. = 0.52$; $t(2\ 4\ 5) = -4.61$, $p < 0.01$) and prosocial behavior ($M_{females} = 3.44$, $s.d. = 0.54$; $M_{males} = 3.24$; $s.d. = 0.58$; $t(2\ 4\ 5) = -2.54$, $p < 0.05$), and lower levels of aggressive behavior ($M_{females} = 2.31$, $s.d. = 0.81$; $M_{males} = 2.62$; $s.d. = 0.76$; $t(2\ 4\ 5) = 2.87$, $p < 0.01$). There was no gender difference in self-esteem.

Testing the model: structural equation model procedures

To test the model presented in Figure 1, structural equation modeling (SEM) was employed. Because of the large number of observed variables indicating the 6 latent variables in the model, item parcels were created to reduce the sample size to number of parameters estimated ratio. In addition, creating these item parcels both normalized the distribution of these observed variables univariately and multivariately and increased the reliability of these indicators relative to the individual items.¹ Item parcels were created by randomly assigning each item for a latent variable to a target item parcel. For example, 4 item parcels were created and served as observed variables for the Parent Attachment latent variable. Each of the 4 item parcels was comprised of 3 randomly selected *items* from the Parent Attachment scale. These randomly selected items were subsequently aggregated to create the new observed variable (i.e., item parcel). Similar procedures were followed to create item parcels for the remaining latent variables.² Using these constructed item parcels as indicators of the six latent variables, the structural model shown in Figure 1 was tested. Subsequent multigroup analyses were then conducted to determine the invariance of the structural paths of this model across gender.

¹ The unidimensionality of each latent variable as indicated by the item parcels was established using confirmatory factor analysis.

² We did not create item parcels for the aggressive behaviors latent variable because this variable was indicated with only five items.

Determination of model fit

Use of the χ^2 likelihood ratio test as a test statistic to assess model fit has been deemed unsatisfactory for numerous reasons (see Tanaka, 1993). Because of these limitations, many researchers (e.g., Hoyle, 2000; Tanaka, 1993) have suggested using multiple measures of model fit. In the current study the following measures were employed: (a) the Satorra–Bentler Scaled χ^2 (S-B χ^2 ; Satorra & Bentler, 1988), a statistical test of model fit when data are multivariately non-normal; (b) the Comparative Fit Index (CFI; Bentler, 1990), with values greater than 0.90 indicating reasonable model fit; (c) and the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), with values less than 0.08 indicating reasonable model fit. The S-B χ^2 was used because slightly non-normal data was expected.³ A model was determined to fit well if both criteria (b) and (c) were met.⁴ In evaluating the statistical significance of individual model parameters (i.e., factor loadings, inter-factor correlations, structural paths), a statistical significance level of 0.05 was employed.

Results of the Model

For the measurement model, all factor loadings were large and statistically significant (standardized values ranged from 0.48 to 0.85, $p < 0.05$). The overall model fit reasonably well according to the descriptive fit indices, S-B χ^2 (221, $N = 263$) = 424.84, $p < 0.05$, CFI = 0.90, RMSEA = 0.06. As shown in the structural portion of the model (see Figure 1), several significant relations were evident. Parent attachment and prosocial behavior were significantly and positively related to self-esteem, suggesting that participants who reported higher parent attachment and prosocial behavior also reported higher self-esteem. Peer attachment and aggressive behavior were not related to self-esteem. Empathy was significantly and positively related to prosocial behavior but significantly and negatively related to aggressive behavior, suggesting that participants who reported higher empathy also reported higher prosocial behavior and lower aggressive behavior. In predicting empathy, only peer attachment (and not parent attachment) was a significant and positive predictor. Participants who reported that they were high in peer attachment also report that they were high in empathy. Finally, the interfactor correlation between parent attachment and peer attachment was significant and positive.

Gender differences in the model

In order to test the invariance of the structural coefficients a multigroup analysis was performed. This model also fit reasonably well according to the RMSEA, S-B χ^2 (450, $N = 263$) = 655.92, $p < 0.05$, CFI = 0.89, RMSEA = 0.06. However, 3 structural coefficients differed between the gender groups (see Figure 2 and Figure 3), with males having a stronger parent attachment-

³ The item parcels did reduce the amount of non-normality in our data by a factor of 3. However, the standardized Mardia's coefficients were still larger than we would like (i.e., they were > 10). Therefore, we used S-B χ^2 as a correction factor for the minor non-normality problem that we had.

⁴ S-B χ^2 is also influenced by sample size, so this value will almost always indicate that a model does not fit significantly well (i.e., $p < 0.05$). For this reason, we rely primarily on the two descriptive fit indices that follow to determine overall model fit.

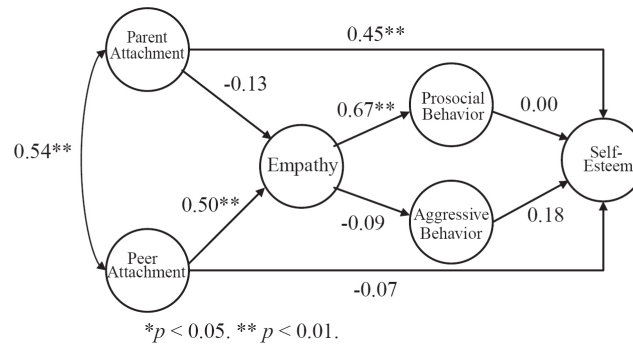


Figure 2. Actual relations among the variables for males ($N = 74$).

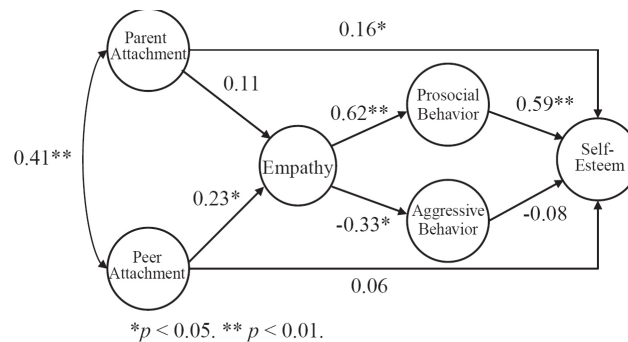


Figure 3. Actual relations among the variables for females ($N = 172$).

self esteem relation than females (β 's = 0.45 vs. 0.16, $p < 0.05$); females having a stronger prosocial-self esteem relation than males (β 's = 0.59 vs. 0.00, $p < 0.05$); and a statistical difference in the parent attachment-empathy relation between males ($\beta = -0.13$) and females ($\beta = 0.11$), although neither individual structural coefficient was statistically significant. Because these structural coefficients were not invariant across gender groups, equality constraints for these paths were removed and the model was re-estimated. This model also fit reasonably well, $S-B\chi^2$ (447, $N = 263$) = 642.32, $p < 0.05$, CFI = 0.90, RMSEA = 0.05, and no further differences were found between the gender groups.

Discussion

The goal of this study was to examine both the direct and indirect relations of parent and peer attachment with self-esteem and to examine the potential mediating roles of empathy and social behavior. Results indicated that both parent and peer attachment were related to adolescent self-esteem, although the nature of the relation was different for each variable. Structural equation modeling suggested that parental attachment was, for the most part, directly related to self-esteem. Adolescents with secure attachments to parents reported higher levels of self-esteem than those reporting insecure attachments. Overall, the finding that parent attachment was directly related to self-esteem in late adolescence is consistent with attachment theory. Attachment theorists

have argued that secure attachments with parents are important for the construction of healthy models of the self (Allen & Land, 1999; Harter, 1990).

Interestingly, the relation between parent attachment and self-esteem was significantly stronger for males than for females. The reason for this finding is unclear. Nevertheless, this finding does suggest that the influences on self-esteem in late adolescence might be different for males and females. For females, self-esteem may be more strongly predicted by indirect influences, such as social behaviors. For males, self-esteem may be more directly related to parental attachment. Clearly, more research is needed to understand this gender difference.

Attachment relationships with peers were also significantly related to adolescents' reports of self-esteem. The findings, however, suggested that (at least in late adolescence) this relation was totally mediated by empathy and prosocial behavior. Thus, attachment security with peers was associated with high levels of empathy. This latter finding was consistent with the notion that close, supportive relationships with peers likely provide adolescents with unique opportunities to develop perspective taking and empathy. As others have argued, peer relationships are distinctive in terms of the level of equality and reciprocity, which provide the optimal context for the acquisition of behaviors reflecting concern for others and kindness (Youniss, 1985). Developmental theorists have long argued that peer relationships are foundational for the acquisition of morality related processes (Piaget, 1935/1965; Sullivan, 1953) and the present findings support this idea. However, it is important to realize that although peer attachment was positively related to reports of prosocial behavior, this relation was completely mediated by empathy. Thus, it appears that peer relationships might exert their influence on self-esteem through the development of moral emotions such as empathy.

Consistent with other research, empathy in this study was related to adolescent self-reports of social behaviors. Adolescents who reported high levels of empathy also reported that they engaged in more prosocial behavior and less aggressive behavior. These findings are also consistent with previous research and theory that suggests that empathy should be linked to the quality of social functioning (Eisenberg & Mussen, 1985; Murphy et al., 1999; Saarni, 1990). Individuals who experience high levels of empathy and related processes, such as perspective taking, are presumed to feel some responsibility towards others and as a result are motivated to reduce their distress (Eisenberg & Fabes, 1998). Similarly, aggression has typically been linked to deficiencies in the cognitive components of empathy, particularly deficits in the cognitive processing of social situations (Crick & Dodge, 1994) and perspective taking (Eisenberg, 1986).

As predicted, prosocial behavior was a significant predictor of self-esteem, particularly in females. Females who reported high levels of prosocial behavior also reported high levels of self-esteem. Adolescents who engage in high levels of prosocial behavior are likely to reap the benefits of feeling good about their involvement in such positive activities (Yates & Youniss, 1996). For females, who are socialized towards an orientation emphasizing relationships and reciprocity (Zahn-Waxler, Cole, & Barrett, 1991), engaging in prosocial behavior may be especially important in fostering feelings of self-worth.

Interestingly, for this sample, aggression was not a significant predictor of self-esteem. Although some researchers have speculated that aggressive behavior is linked with low levels of self-esteem, findings linking aggression with self-esteem have not always been consistent (East & Rock, 1992; Lochman & Dodge, 1994). In fact, some researchers (e.g., Baumeister et al., 2000) have argued that inflated self-esteem and narcissism might lead to aggression. It seems likely that the

pattern of relations between self-esteem and aggression is complicated and may vary depending on the type and severity of the aggression. Of course, part of the reason that this study did not find a relation between self-esteem and aggression may be that the levels of aggression in this sample were relatively low. Clearly, more research is needed on this question, especially research that examines the links between self-esteem and different types of aggressive behavior.

As with any study, there are a number of shortcomings that limit the interpretability of the present findings. First, the study relied only on self-report data from adolescents. Other methods of research are needed to confirm the pattern of relations (especially longitudinal designs and observational research). In addition, given the correlational nature of the study, it is impossible to determine the direction of the observed effects in this study. Although theoretically it is plausible that that parent and peer attachment foster empathy and self-esteem, an equally plausible argument is that the direction of the effects is reversed (i.e., well-adjusted adolescents more easily develop secure attachments with parents and peers). As others have argued, however (e.g., Bell, 1968; Maccoby & Martin, 1983), the direction of the effects is likely bidirectional, with secure attachment relationships with peers and parents fostering adolescent and adult adjustment, and this in turn fostering the preservation and subsequent formation of secure relationships.

Despite these limitations, this research has important implications for future research and program development. First, the findings from this study suggest that although close supportive relationships with parents and peers are linked to adolescent self-esteem, these links are complex. Thus, future researchers need to examine the potential mediating factors that might account for some of the associations between attachment relationships and self-esteem. Second, this study adds to the sparse literature examining the relations between prosocial behavior and self-esteem in adolescence. These findings are consistent with theory that prosocial behavior is linked with adolescent well-being in adolescence (Fabes, Carlo, Kupanoff, & Laible, 1999). Finally, these findings suggest that programs designed to foster self-esteem in adolescence need to consider fostering empathy and prosocial behaviors in addition to promoting positive relationships with peers and parents.

Acknowledgments

The authors would like to extend their deepest thanks to Ervin Briones for his valuable contribution to the project. The authors also appreciate the assistance of Clarissa Bendezu, Kathryn Meyer, and Ellen Wilson. The project was supported by grants to Gustavo Carlo and Marcela Raffaelli from the Institute for Ethnic Studies, the Gallup Research Center, and the University of Nebraska Research Council. Writing support for Gustavo Carlo was provided by a grant from the National Science Foundation (NSF 0132302).

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The Inventory of Parent and Peer Attachment: Individual Differences and Their Relationship to Psychological Well-Being in Adolescence

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Received December 6, 1985; accepted March 19, 1987

The results of two studies are reported. Study I involved the development of the Inventory of Parent and Peer Attachment (IPPA), a self-report instrument for use with adolescents. Subject were 179 college students aged 16–20 years. Item content of the instrument was suggested by attachment theory's formulations concerning the nature of feelings toward attachment figures. In Study II, the convergent validity of the IPPA was examined. Also, a hierarchical regression model was employed to investigate the association between quality of attachment and self-esteem, life-satisfaction, and affective status. Respondents were 86 adolescents from the Study I sample. As hypothesized, perceived quality of both parent and peer attachments was significantly related to psychological well-being. Results of the development of a theoretically focused, exploratory classification scheme indicated that adolescents classified as highly securely attached reported greater satisfaction with themselves, a higher likelihood of seeking social support, and less symptomatic response to stressful life events.

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INTRODUCTION

The relationship between ties to one's family and one's personality and well-being has long been a question of interest in developmental psychology. Recently, there has also been a growing recognition of the increasing importance of extrafamilial relationships through childhood and adolescence. In the present study, we examine the attachment relationships of late adolescents to their parents and peers, and explore their differential association to well-being.

Attachment is generally defined as an enduring affectional bond of substantial intensity. The central concern of attachment theory is the implication of optimal and nonoptimal social attachments for psychological fitness (Ainsworth, Blehar, Waters, and Wall, 1978; Bowlby, 1973a, 1977; Bretherton, 1985; Hinde, 1982; Sroufe, 1978, 1979). Bowlby's theoretical work (1969/1982, 1973b, 1980) conceptualizes the formation of attachments in infancy, and explains the emotional and psychological disturbances that may result at any age from their actual or threatened disruption. Organized patterns of behavior that develop and maintain affectional bonds are seen to persist throughout life, and to be activated in order to maintain or regulate some degree of proximity to highly discriminated persons. A sense of security is derived from the maintenance of a bond in which confidence in the availability (accessibility and responsiveness) of the attachment figure(s) predominates over fears concerning unavailability of this figure(s) in times of need. By contrast, anxiety, sadness, depression, and anger may be produced by the threatened or actual loss of attachment relationships, or by unresponsive and unpredictable attachment relationships. According to Bowlby's model (1973b), the child with secure attachment to principal care-givers carries an unconscious assurance that s/he has access to trustworthy, helpful others, and views him/herself as worthy of love and caring. Such a child is more likely to develop a balance of self-reliance and appropriate help-seeking capacities as s/he matures.

Bowlby (1969/1982) has concluded that human beings at any age are most well-adjusted when they have confidence in the accessibility and responsiveness of a trusted other. In his view, attachment across the life span may be inferred from a behavioral disposition to seek proximity to and/or contact with particular others, under conditions of vulnerability (fear, illness, etc.). With increasing age, behaviors promoting proximity to attachment figures become somewhat less intense and frequent, and symbolic communications (e.g. phone calls, letters) become increasingly effective in providing comfort. Despite such age-related changes in attachment behavior, expectations of attachment figures based on earlier experience are believed to persist and to influence the individual's mode of relating to others. Exam-

ples of aspects of "interactional styles" (Bretherton, 1985) that may develop from insecure attachment(s) are anxious "clinging" and resentful detachment.

Most research carried out within the framework of attachment theory has centered on the concept of security of attachment in early childhood. Observational research conducted by Ainsworth and her associates (1978) has demonstrated that individual differences in patterns of attachment behaviors in infancy, as evidenced in the Ainsworth and Wittig (1969) Strange Situation, are reliably classifiable as "secure" and "insecure" ("ambivalent" or "avoidant"). Such differences show substantial stability under conditions of family and caretaking continuity (Ainsworth *et al.*, 1978; Vaughn, Egeland, Sroufe, and Waters, 1979; Waters, 1978). Security of attachment at one year has been shown to be related to ego strength and peer and social competence in the preschool years (Arend, Gove, and Sroufe, 1979; Easterbrooks and Lamb, 1979; Matas, Arend, and Sroufe, 1978; Waters, Wippman, and Sroufe, 1979).

There is a growing interest in extending the study of attachment beyond early childhood (Greenberg, Siegal, and Leitch, 1984; Kahn and Antonucci, 1980; Lerner and Ryff, 1979). Weiss (1982) and Bretherton (1985) have argued that attachment beyond childhood is reflected in continuity in the organization of the individual's "perceptual-emotional system" or "internal working model." Weiss (1982) observes that, while there are increasing intervals during which parental accessibility is not necessary for adolescents' felt security, confidence in their parents' commitment to them remains crucial. His interview studies suggest that as adolescents mature the sense of security fostered by their parents becomes less due to their actual presence and more due to their capacities to function as competent allies. Clinical observation suggests that the ease with which adolescents cope with the conflicts involved in achieving independence from parents and identity formation is critically influenced by the elements of trusts, mutual respect, and good rapport in relationships with parents (Bloom, 1980; Blos, 1975).

As suggested by attachment theory, Weiss (1982) has found that adults' attachments to their peers are characterized by seeking out attachment figures when under duress, by experiencing anxiety when these figures are inaccessible, and by feeling comforted in their company. His research (1973, 1974) also suggests that attachment bonds are found only in those relationships perceived as emotionally significant. Similarly, Henderson (1977, 1982) has concluded that, rather than the actual availability of social relationships, it is the perceived adequacy of the adults' relationships, especially in the presence of adversity, that is most crucial in terms of the degree of risk of developing neurotic impairment.

During adolescence, attachment behavior is often directed toward non-parental (noncaretaking) figures (Weiss, 1982). While peers may not neces-

sarily be considered stronger or wiser (as per Bowlby's definition of childhood attachment), they may be considered such on a situational or temporary basis, as in adult peer relationships. Thus, certain peer relationships, especially beginning in adolescence, can be considered as a type of attachment relationship. In Weiss's view, a particularly important aspect of adolescent peer attachment is the peer's ability to support and encourage the adolescent's assumption of growth-promoting challenges.

As might be expected from the preceding theory, there is evidence of a strong link between the adolescent's intimate relationships and such outcomes as self-concept, psychological adjustment, and physical health (Bachman, Kahn, Mednick, Davidson, and Johnston, 1967; Coopersmith, 1967; Gallagher, 1976; Offer and Offer, 1975; Greenberg *et al.*, 1984; Thomas, Gecas, Weigart, and Rooney, 1974). In their study of 13- to 20-year-olds, Burke and Weir (1978) found that those adolescents expressing greater satisfaction with help received from peers, and particularly from parents, experienced greater psychological well-being. Rosenberg (1965) reported a stable relationship throughout adolescence between self-esteem and perception of warm relationships with parents. In college students, warm and autonomous relations with parents has been found to be associated with higher stages of ego-identity (Marcia, 1980), greater self-disclosure tendencies (Snoek and Rothblum, 1979), and, in freshman males, better predicted well-being in the senior year than did academic status and involvement in activities (Mortimer and Lorence, (1980).

Studies in which the influence of parents and peers on well-being is compared have focused primarily on self-esteem. In all studies, perceptions of parental relations were more highly related to self-esteem than were peer relations (Gecas, 1972; Greenberg *et al.*, 1984; O'Donnell, 1976). More research is needed, however, concerning the relative importance of relationships with parents and peers for well-being during late adolescence.

Despite the existing body of literature on the importance of these figures, currently there is no standardized self-report measure that assesses adolescent parent and peer relations using the conceptual framework of attachment theory. Attachment theory provides a rich source of hypotheses concerning ontogenetic continuity and change and individual differences in attachment, and their relationships to other aspects of intrapsychic and interpersonal functioning. The development of an attachment instrument would assist in testing alternative hypotheses regarding the relative importance of different figures for psychological well-being in adolescence and early adulthood.

The multidimensional character of attachment is implicit in attachment theory and research (Parkes and Stevenson-Hinde, 1982). Two major dimensions of attachment are suggested by the literature; behavioral aspects and affective/cognitive aspects (cf. Hinde, 1982). Observational studies of in-

phants assess the former dimension, from which affective experience is inferred. As cognitive capacities increase, attachment behavior is theorized to be guided by cognitively based "working models" of attachment figures. The use of a self-report instrument to assess adolescent attachment, rather than an observational procedure, could tap not only behavioral elements of adolescents' proximity seeking and support seeking, but also the affectively toned cognitive expectancies that are part of the "internal working model" the individual has of attachment figures (Bretherton, 1985). These two dimensions could be expected to be correlated. The use of self-report reflects the view that attachment represents aspects of a relationship from the point of view of one individual in the dyad, in this case, the adolescent (Hinde, 1982; Henderson, Byrne, and Duncan-Jones, 1981).

Following Bowlby's attachment theory, Greenberg and his colleagues (1984) developed a self-report measure of the behavioral and affective/cognitive dimensions of adolescents' attachment to their parents and peers. Their findings that 12-to 19-year-old adolescents' attachments to both parents and peers were related to self-esteem and life satisfaction (correlation coefficients were between .30 and .40) suggest the role of attachments in psychological well-being, as postulated by attachment theorists. While Greenberg's measure provided greater operational clarity as to the nature of attachment in adolescence, the scale reliabilities were only moderate. Furthermore, because the affective dimension was unifactorial, exploration of individual differences in the nature of attachment was limited. By examining qualitative dimensions of attachment, their roles in the development of individual differences may be studied.

In this report, we examine the general affective/cognitive dimensions of attachment to parental and peer figures. We hypothesized that the "internal working model" of attachment figures may be tapped by assessing (1) the positive affective/cognitive experience of trust in the accessibility and responsiveness of attachment figures, and (2) the negative affective/cognitive experiences of anger and/or hopelessness resulting from unresponsive or inconsistently responsive attachment figures. Because a major question addressed in this research follows from the current controversy regarding the differential impact of parent and peer influences, we chose not to inquire about both mother and father, or about different types of peer relationships. Instead, as a variety of figures (parents or peers) might differentially affect the adolescent, we suggested to our adolescent subjects that they respond regarding the parents or peers who most influenced them. Our intention is to present the early results of our scale development efforts in order to provide impetus for the generation of ideas concerning the nature and measurement of adolescent attachment.

The present studies aimed (1) to develop a more comprehensive and reliable measure of attachment that is multifactorial, and (2) to attempt to

use this measure to examine the role of security of attachment in late adolescence.

STUDY I

Purpose

The purpose of Study I was to develop a reliable multifactorial measure of adolescent attachment. It was hypothesized that parent attachment items would load on separate factors from peer items, since they are presumed to assess distinct attachment systems.

Method

Sample

The Inventory of Parent and Peer Attachment (IPPA) was developed with two samples of undergraduate students at the University of Washington who were enrolled in departmental courses and participated in research for additional credit. Sample I ($n = 93$) was obtained in Spring 1981, and Sample II ($n = 86$) in Fall 1982. Sixty-three percent of the subjects were female. The age range was 16–20 years, with a mean age of 18.9 years. Approximately 75% of subjects were Caucasian. The sample was predominantly middle class. Family background characteristics of the sample were not available.

Procedure

Subjects completed a 60-item questionnaire by indicating how often each statement was true for them on a 5-point Likert scale. Response categories were *Almost Never or Never*, *Seldom*, *Sometimes*, *Often*, and *Almost Always or Always*. The two extreme responses were scored as 1 or 5, depending on whether an item was positively or negatively worded. Scale construction began with expanding the Inventory of Adolescent Attachments (Greenberg *et al.*, 1984) in order to include more comprehensive coverage of Bowlby's theoretical formulations (1969/1982, 1973b, 1980) concerning attachment behavior and the nature of feelings toward expectations about attachment figures. Items were designed to assess the adolescent's trust (felt security) that attachment figures understand and respect her/his needs and desires, and perceptions that they are sensitive and responsive to her/his emotional states and helpful with concerns. Items assessing anger toward or emotional detachment

from attachment figures are also included, since frequent and intense anger or detachment are seen to be responses to actual or threatened disruption of an insecure attachment bond. Items tapping parent attachment were grouped separately from peer-attachment items. Generally, a parent item had a corresponding peer item, worded similarly. Exceptions were items with obvious family context or general alienation items. If subjects felt they had a very different relationship with mother and father, they were instructed to respond to the parent items for the parent who had "most influenced" them (see the discussion section). Subjects were asked to think about their closest friendships when answering the peer items.

Results

In order to examine their underlying structure, the attachment items were factor analyzed using principal factoring with iteration and Varimax rotation. Loading patterns suggested the appropriateness of separating items assessing parent attachment from items assessing peer attachment in future analyses. Twenty-nine of 31 parent items had loadings greater than .35 on Factor I, while 21 of 29 peer items had loadings greater than .35 on Factor II. No peer item loaded greater than .28 on Factor I, and no parent item loaded greater than .19 on Factor II. Because the two items assessing general feelings of alienation loaded higher on Factor I and had loadings of less than .30 on Factor II, such items were grouped with parent items in the inventory.

The 31 parent and 29 peer items were then separately analyzed using Varimax rotation. For the parent measure, three factors emerged with eigenvalues greater than 1. Together they accounted for 92% of the total variance and were found to have readily interpretable patterns of factor loadings. The first factor, with loadings ranging from $-.20$, to $+.71$, had highest loading for items suggesting themes of parental understanding and respect, and mutual trust. The second factor, with loadings ranging from $-.21$ to $+.76$, had highest saturations for items related to the extent and quality of verbal communication with parents. Items loading highly on the third factor (loadings ranged from $-.43$ to $+.64$) suggested feelings of alienation and isolation. For the peer measure, three factors emerged with eigenvalues greater than 1. These factors accounted for 84% of the total variance and were readily interpretable. As in the first parent factor, item content of the first factor suggested mutual trust and respect; loadings were $-.44$ to $+.79$. The second peer factor (loadings ranged from $-.27$ to $+.76$) had highest loadings for items assessing perceived quality of communication. Factor III suggested alienation from friends but with the recognition of the need to be closer to them; loadings were $-.42$ to $+.59$.

Preliminary scales were created from the six factors by selecting and summing items with loadings of .30 or greater. Items satisfying this criterion on more than one factor were assigned on the basis of the higher(est) loading. In the few cases where loadings differed by less than .10, assignment was made on the basis of conceptual content. In a final item-selection step, items were removed if their inclusion in a scale reduced its internal consistency (Cronbach's alpha). The three final parent scales are Trust (10 items; alpha = .91), Communication (10 items; alpha = .91), and Alienation (8 items; alpha = .86). The final peer scales are Trust (10 items; alpha = .91), Communication (8 items; alpha = .87), and Alienation (7 items; alpha = .72). Appendix A lists the items comprising the IPPA. Examination of the range of scores revealed that at least 68% and on the average 80% of the possible score ranges of these scales were utilized by the sample, indicating acceptable differentiation of subjects. The final sets of parent and peer items were factor analyzed using the Varimax rotation, with the number of factors to be extracted limited to three. As shown in Appendix B, factor loadings for the parent items ranged from .45 to .74; for the peer items the range was .45 to .75.

Table I presents the Pearson correlations between the six parent and peer scales. All intercorrelations were significant at the 1% significance level or less. Parent scales were more highly related to each other than they were to the peer scales. Trust and Communication scores were highly correlated within both parent ($r = .76$) and peer ($r = .76$) measures. Corresponding parent and peer scales were not as strongly related; the coefficient obtained for the Trust scales was .33, for the Communication scales, .29, and for the Alienation scales, .47.

The patterns of factor loadings suggest a partial confirmation of the notion of positive and negative affective/cognitive dimensions of attachment. However, the intercorrelations among the factor-based scales suggest, with the possible exception of peer Alienation vs peer Trust and peer Communica-

Table I. Intercorrelations of IPPA Scales^a

	Parent		Peer		
	Communication	Alienation	Trust	Communication	Alienation
Parent					
Trust	.76	-.76	.33	.26	-.24
Communication		-.70	.25	.29	-.22 ^b
Alienation			-.28	-.21 ^b	.47
Peer					
Trust				.76	-.46
Communication					-.40

^aps are one-tailed and < .001 unless indicated.

^bp < .01.

tion, that these factors are not independent as assessed with the current item content. For this reason, in Study II the attachment measure is first treated as a unifactorial measure assessing aspects of security-insecurity along a single dimension. This is followed by an exploratory approach to classifying individual differences in attachment utilizing the factor-based subscales.

STUDY II

Purpose

Having found evidence for favorable internal reliability of the IPPA, Study II was designed with the objective of assessing the validity of the instrument by examining its relation to measures of psychological well-being, family environment, and support-seeking from significant others. In accordance with the organizational view of attachment (Bowlby, 1973b; Sroufe and Waters, 1977), the following hypotheses were formulated: First, quality of attachment to parents and peers would be related to measures of well-being. In order to test this, a hierarchical regression model was employed, using a linear attachment score. The second hypothesis was that adolescents with qualitatively different attachments to parents and peers would differ in proximity seeking and in well-being. Third, the associations between negative life change and psychological symptomatology would be weaker for the group of adolescents who are more securely attached. In order to test the latter two hypotheses, two attachment groups were defined according to a set of decision rules regarding the interrelationships among subscores obtained on the attachment measure. In addition, Study II examined the test-retest reliability of the IPPA.

Method

Sample

The subjects were a subsample of Study I (Sample II), consisting of 32 male and 54 female undergraduate students. (Sample I was not available for the longer testing period required.) Subjects ranged in age from 17 to 20 years, with a mean age of 18.6 years. Over 80% were Caucasian; approximately 15% were Asian or Asian-American. Seventy-one subjects reported having lived with both parents most of their lives; of the remaining 15, all but one had lived with their mothers. All subjects had one or more siblings. Nearly three-quarters of the sample were living away from home at the time of data collection.

Procedure

Subjects completed all questionnaires in one session. Data were collected using the following measures:

Well-Being. The Tennessee Self-Concept Scale (TSCS; Fitts, 1965). This scale is a collection of 100 self-descriptive statements with a 5-point Likert rating. A total positive score, calculated from 90 items, assesses overall self-esteem. Scores computed from subsets of these 90 items provide self-concept subscales for more limited domains; in this study the Family Self and Social Self subscales were utilized. The Total Conflict score provided a measure of the extent of confusion or contradiction in self-perception. The Self-Criticism scale, consisting of 10 items taken from the Minnesota Multiphasic Personality Inventory L-Scale, was used to obtain a measure of the capacity for critical self-evaluation (high scores) or alternatively, of the tendency for defensive, more socially desirable responding (low scores). High test-retest reliabilities (typically in the mid-80s) have been reported for the major TSCS scales (Bentler, 1972).

For purposes of the cross-validation of outcome measures, a single global question was also used to assess life satisfaction. Each subject was asked to indicate whether she/he was *very dissatisfied* (scored as 1), *a little dissatisfied, neither satisfied nor dissatisfied, well satisfied, or completely satisfied* (scored as 5) with her/his life in general. In a study of late adolescents, two-week test-retest reliability of this measure was .81 (Greenberg *et al.*, 1984).

Affective Status. Eleven scales assessing dimensions of emotional status were selected from Bachman's (1970) Affective States Index, which was constructed for use with adolescents. As part of the present study, results were factor analyzed and four scales were derived from the original 11: Depression/Anxiety (21 items; $\alpha = .95$), Irritability/Anger (11 items; $\alpha = .89$), Resentment/Alienation (9 items; $\alpha = .88$), and Guilt (2 items; $\alpha = .83$). Scale intercorrelations ranged from .47 (for Guilt and Resentment/Alienation) to .80 (for Depression/Anxiety and Resentment/Alienation).

Family Characteristics. The Family Environment Scale (FES) profiles the social climate of an individual's family (Moos, 1974). The items are grouped into 10 subscales. Six subscales, consisting of nine items each, were examined: Cohesion, Expressiveness, Conflict, Organization, Control, and Independence. The first three of these characteristics are conceptualized as relationship dimensions assessing feelings of belonging and perceptions of the extent of mutual support, openness, and conflict in family members' interactions. Organization and Control scores are intended to reflect dimen-

sions related to maintenance of the family as a system, i.e., the degree of structure and control imposed by members vis-à-vis each other. The Independence subscale, one dimension of personal development, measures encouragement of autonomy and of the development of individual interests.

Stressful Life Events. The Life Events Checklist (Johnson and McCutcheon, 1980) was tailored from the Life Events Survey (Sarason, Johnson, and Siegel, 1978) for use with adolescent samples. Respondents are asked to indicate which of 47 listed events occurred in the past year and to rate each event's type of impact (positive or negative) and degree of impact (*no* [0], *some*, *moderate*, or *great* [3]). Life-Change scores are calculated by summing impact ratings separately for positive and negative events. This provision of positive and negative scores is a methodological acknowledgment of indications that only subjectively negative events are related to psychological and physical health status in adolescents (Sarason *et al.*, 1978). Brand and Johnson (1982) report two-week test-retest reliabilities of .71 for positive events and .66 for negative events.

Proximity Seeking. Two types of measures provided information about self-reported behavior in situations where a desire to seek out other (particularly significant others) would be expected. First, the Family and Peer Utilization factors from the Inventory of Adolescent Attachment (Greenberg *et al.*, 1984) was used to assess how frequently (*never*, *sometimes*, *often*) subjects sought out family members and friends in five situations. The situations selected were when feeling lonely, depressed, angry, anxious, or happy. Scale scores consisted of the sum of the frequencies with which the individual went to any one of or group of the attachment figures in the five situations. Four Utilization scales were examined: Mother, Father, Family (parents and siblings), and Peer (male and female friends plus steady boy- or girlfriend). A second self-report measure assessed the frequency of proximity seeking in both (1) everyday, annoying situations and (2) more complicated, upsetting situations. A 5-point Likert scale was used for each type of situation. *I never share my concerns with others* was scored as 1 while *I always share my concerns with others* was scored as 5. Subjects were also asked to indicate their desired (rather than actual) frequency of sharing concerns in both types of situations.

Questions were also asked concerning frequencies of subject- and parent-initiated telephone contact and visiting with parents. Subjects were also asked the following: Have you lived with both parents most of your life? Do you consider your relationship with your father very different from that with your mother? If so, do you have a closer relationship with your mother or your father? Subjects not living at home were asked how frequently they visited their parents.

Results

Sex Differences

Scores on all measures were examined for sex differences. Females scored significantly higher on Mother Utilization ($F[1,84] = 13.0, p < .001$), and Parent Utilization ($F[1,84] = 4.25, p < .05$). In addition, females reported more negative life change ($F[1,85] = 7.7, p < .01$) and were less consistent than males in their concepts of themselves (TSCS Total Conflict scores: $F[1,82] = 6.9, p < .01$). As 94% of the sample were between 18 and 19 years of age, age differences were not examined. Caucasian vs non-Caucasian, and living at home vs living away, comparisons of utilization scores proved nonsignificant.

Convergent Validity of IPPA

A summary score of quality of attachment was separately defined for parents and peers as the degree of trust and communication relative to alienation. This summary score was necessary for regression analysis, due to the high intercorrelations among subscales. Parent and Peer Attachment scores for each individual were computed by summing Trust and Communication raw scores, and subtracting from this sum the Alienation raw score. Parent Attachment scores ranged from 16 to 92 ($\bar{X} = 60.7, SD = 16.2$). The score range for Peer Attachment was 19 to 82 ($\bar{X} = 56.6, SD = 10.4$). For a separate sample of twenty-seven 18–21-year olds (mean age = 20.1), three-week test-retest reliabilities were .93 for the Parent Attachment measure and .86 for the Peer Attachment measure.

Females scored higher than males on Peer attachment ($F[1,84] = 21.45, p < .0001$). This finding, together with gender differences found on several other measures, would ordinarily suggest separate male/female analyses. Because of the small sample size, however, such separate analyses would most likely prove unreliable. No differences were found on Attachment scores between Caucasians and non-Caucasians, or between subjects living at home and subjects living away from home.

The qualities of parent and peer attachments were expected to be directly related to growth-promoting family characteristics, positive perceptions of oneself as family member and social being, and frequency of seeking out significant others in times of need. Therefore, data from the FES, TSCS, and Family and Peer Utilization factors were used to evaluate the convergent validity of the IPPA. As can be seen in Table II, Parent Attachment scores correlated significantly with five of the six indices of family climate.

Table II. Correlations Between IPPA Scores and Scores on the TSCS, FES, and Utilization Factors

	Parent Attachment	Peer Attachment
TSCS		
Family self-concept	.78 ^c	.28 ^b
Social self-concept	.46 ^c	.57 ^c
FES		
Cohesion	.56 ^c	.15
Expressiveness	.52 ^c	.25 ^b
Conflict	-.36 ^c	.04
Independence	.15	-.01
Organization	.38 ^c	.02
Control	-.20 ^a	-.12
Mother Utilization	.62 ^c	.33 ^c
Father Utilization	.60 ^c	.27 ^b
Family Utilization	.54 ^c	.28 ^b
Peer Utilization	.18 (<i>n</i> = 55)	.32 ^b (<i>n</i> = 55)

^a*p* < .05 (one-tailed).^b*p* < .01.^c*p* < .001.

Highest correlation coefficients were obtained for the FES Cohesion and Expressiveness scales (.56 and .52, respectively; *p* < .001). Family self-concept, as measured by the TSCS, appeared strongly associated with parent attachment (*r* = .78). Consistent with theoretical expectations, parent attachment moderately correlated with seeking out parents in times of need.

As expected, Peer Attachment scores correlated most highly with TSCS Social Self-Concept (*r* = .57, *p* < .001). Peer attachment on the whole was not related to the measures of family environment. The correlation between peer attachment and peer utilization was significant but weaker than that between parent attachment and parent utilization. Furthermore, peer attachment was equally related to Parent and Peer Utilization factors. Neither Parent nor Peer Attachment scores were significantly correlated with scores on the TSCS Self-Criticism scale (an indicator of social desirability).

Attachment, Well-Being, and Affective Status

In order to test the relationship of quality of attachments to measures of psychological status, hierarchical multiple regression analyses were performed. The criterion variables examined were two well-being measures (Self-Esteem and Life-Satisfaction) and four indices of affective status (Depression/Anxiety, Resentment/Alienation, Irritability/Anger, and Guilt). Sex was entered in the first step, followed by simultaneous entry of positive and negative life-change. Inclusion of the attachment variables followed. The inter-

Table III. Intercorrelations of Predictor Variables

	Negative life change	Parent Attachment	Peer Attachment
Positive life change	.18	.24 ^a	.11
Negative life change		-.27 ^b	-.03
Parent attachment			.36 ^c

^a $p < .05$.^b $p < .01$.^c $p < .001$.

correlations of the predictor variables, excluding sex, are presented in Table III. In consideration of the predictors' multicollinearity, Parent Attachment was entered after Peer Attachment, thus biasing against its presumed greater explanatory power.

Table IV presents the results of the multiple regression analyses for the well-being measures. The variables accounted for 59% of the total variance in Self-Esteem scores and 53% of the variance in Life-Satisfaction scores. Positive and negative life change and Peer and Parent Attachment all significantly predicted both self-esteem and life satisfaction. Life-Change scores accounted for 21% of the variance in Self-Esteem scores and 31% of the variance in Life-Satisfaction scores. Peer Attachment appeared more highly related to self-esteem than to life satisfaction, accounting for 20% and 7% of the variance, respectively, in these measures. Parent Attachment was highly significantly related to both well-being measures, even though estimation of its contribution was biased against by its late entry into the multiple regression equation. Eighteen and 15% of the variances in Self-Esteem and Life-Satisfaction, respectively, were accounted for by Parent Attachment scores.

Table IV. Regression Statistics for Predicting Well-Being from Peer and Parent Attachment Scores

Criterion	Predictor	R^2 ^a	F ^b	r
Self-esteem	Positive life change	.06	8.4 ^c	.22
	Negative life change	.21	15.7 ^d	-.35
	Peer attachment	.40	26.6 ^d	.45
	Parent attachment	.58	33.3 ^d	.67
Life satisfaction	Positive life change	.15	22.6 ^d	.38
	Negative life change	.31	19.7 ^d	-.33
	Peer attachment	.38	9.0 ^c	.33
	Parent attachment	.53	25.6 ^d	.64

^aReflects cumulative R^2 .^b F -to-enter value.^c $p < .01$.^d $p < .001$.

Table V. Regression Statistics for Equations Predicting Affective Status from Peer and Parent Attachment Scores

Criterion	Predictor	R^2 ^a	F ^b	r
Depression/ Anxiety	Positive life change	.05	7.5 ^e	-.18
	Negative life change	.25	22.2 ^f	.43
	Peer attachment	.35	12.6 ^e	-.33
	Parent attachment	.43	11.1 ^e	-.53
Resentment/ Alienation	Positive Life Change	.03	5.4 ^d	-.16
	Negative Life Change	.24	23.5 ^f	.41
	Peer Attachment	.35	12.9 ^e	-.38
	Parent Attachment	.44	13.4 ^f	-.56
Irritability/Anger	Positive Life change	.03	4.8 ^d	-.16
	Negative Life Change	.22	20.1 ^f	.37
	Peer Attachment	.28	7.0 ^d	-.34
	(Parent Attachment) ^c	(.29)	(1.1)	(-.35)
Guilt	Negative Life Change	.14	11.4 ^e	.35
	Peer Attachment	.23	9.3 ^e	-.27
	(Parent Attachment)	(.23)	(0.1)	(-.24)

^aReflects cumulative R^2 .^b F -to-enter value.^cVariables in parentheses contributed nonsignificantly to the regression equation.^d $p < .05$.^e $p < .01$.^f $p < .001$.

The contribution of sex was nonsignificant for both well-being criterion measures.

The results of the multiple regression analyses for the affective-status measures are presented in Table V. Together, the life-change variables accounted for between 14 and 25% of the total variance in affective status scores. Similar to the results for the well-being criterion measures, the predictors accounted for 43 and 44% of the total variances in Depression/Anxiety and Resentment/Alienation, respectively. Positive and negative life change and Peer and Parent Attachment all significantly predicted scores on these two affective-status measures. On the average, Peer Attachment accounted for about 9% of the total variance in scores on affective-status measures. Parent Attachment accounted for an additional 8% of the variance in Depression/Anxiety and 9% in Resentment/Alienation scores. However, Parent Attachment accounted for an additional 8% of the variance in Irritability/Anger, and Guilt scores. Similar to the well-being measures, affective status was not predicted by sex.

Summarizing the multiple regression analyses, when entered last into the regression equation (following sex and negative life change), Parent and Peer Attachment together accounted for 37% of the variance in Self-Esteem and 22% of the variance in Life-Satisfaction scores. Parent and Peer Attach-

ment together also contributed to between 7 (Anger/Irritability) and 20% of the explained variance in affective-status measures. The Attachment variables accounted best and approximately equally for the variances in Depression/Anxiety and Resentment/Alienation scores. Parent Attachment did not, however, predict Irritability/Anger or Guilt, even when brought into the regression equations prior to Peer Attachment.

Individual Differences in Attachment

In order to begin examination of individual differences in attachment across types of relationships, an exploratory categorization of subjects was made. Parent attachment and peer attachment were considered separately. The score distribution of each IPPA subscale (Trust, Communication, Alienation) was divided into lowest, middle and highest third. Because of the significant sex differences in two of three Peer Attachment subscales, the separate distribution of the Peer subscale scores for male and female subjects were divided as just described. Each subject was then given a rating of "low," "medium" or "high" for each of the three subscales according to where her/his score fell. A set of logical rules defined attachment group assignment:

1. Individuals were assigned to the *High Security* (HS) group if their Alienation scores were not high, and if their Trust or Communication scores were at least medium level. Because of the theoretical importance given by Bowlby to the element of trust in the attachment relationship, in cases where Trust scores were only medium level but Alienation scores were also medium level, HS group assignment was not made.
2. Individuals were assigned to the *Low Security* (LS) group if their Trust and Communication scores were both low, and if their Alienation scores were medium or high level. In cases where the Trust or Communication score was medium level but the other was low, LS group placement was made if the Alienation score was high.

Using this scheme, 66% of the sample was assignable to a parent attachment group and 49% fell into one of the peer attachment comparison groups. While the individuals scoring in the midrange were excluded from this analysis, it was our intention to define, on theoretical grounds, two attachment comparison groups that would be maximally distinct (see the discussion section). The compositions by sex of the Parent and Peer Attachment groups are shown in Table VI. Overall chi-square analyses were not significant. Defining peer-group membership separately for the sexes avoided substantial overrepresentation of females in the HS group and males in the LS group (confounding attachment type with sex in analyses). Had the entire sample's score distributions been utilized for the peer group categorization

Table VI. Frequencies and Proportions of Males and Females in Attachment Groups^a

	High security	Low security	Not categorized
	Parent ^b		
M	.34 (11)	.41 (13)	.25 (8)
F	.37 (20)	.24 (13)	.39 (21)
Total	.36 (31)	.30 (26)	.34 (29)
	Peer ^c		
M	.34 (11)	.32 (10)	.34 (11)
F	.20 (11)	.19 (10)	.61 (33)
Total	.26 (22)	.23 (20)	.51 (44)

^aFrequencies are in parentheses.^b $\chi^2(2) = 3.01$, n.s.^c $\chi^2(2) = 5.75$, n.s.

procedure, females would have comprised fully 87% of the HS group and only 20% of the LS group.

Of those subjects who had lived with both parents most of their lives, 51% (36) reported having a very different relationship with Father than with Mother. All but six of these individuals reported feeling closer to Mother than Father. Chi-square tests revealed no significant differences between subjects in the HS and LS parent-attachment groups on the following variables: ethnicity (Caucasian vs non-Caucasian), history of residence with one or both parents, and feeling closer to mother than to father. Of the 15 subjects who had lived separately from one parent for most of their lives, 10 were assignable to either the HS or LS parent attachment groups. These 10 subjects had no greater probability of placement in the LS group to parents than did the remainder of the sample.

In order to explore the validity of assigning adolescents to differential-ly defined attachment groups, the parent and peer attachment groups were separately compared on variables theoretically expected to distinguish them. Separate set of *t* tests for parent and peer comparison groups were conducted to test the hypotheses that the HS group was higher than the LS group in self-esteem, life-satisfaction, and proximity seeking, while lower than the LS group in negative affective states, and degree of confusion or contradiction in self-concepts.

As Table VII shows, the HS parent-attachment group was significantly different from the LS group on all measures except Guilt and Peer Utilization. The mean self-esteem score for the HS group (367) fell at the 70th percentile according to normative data provided by Fitts (1965) for individuals aged 12–68 years; the mean self-esteem score for the LS group was 320 (20th percentile). When the sharing-of-concerns data were examined, although the parent group did not differ in frequency of sharing everyday concerns, reported frequency of sharing serious concerns was significantly lower for the LS group ($t = 3.67$, $df = 55$, $p < .001$). Consistent with this result is the find-

Table VII. Summary of Tests of Differences Between Parent and Peer Attachment Groups (*t* Values)

	Parent	Peer
	High security vs low security ^a	High security vs low security ^b
Self-Esteem		
(TSCS total positive)	5.11 ^e	3.14 ^e
Life Satisfaction	4.61 ^e	3.01 ^d
Depression/Anxiety	-4.64 ^e	-4.16 ^e
Resentment/Alienation	-4.34 ^e	-3.21 ^d
Irritability/Anger	-3.91 ^e	-1.82 ^c
Guilt	n.s.	-2.62 ^d
Mother Utilization	5.88 ^e	n.s.
Father Utilization	6.02 ^e	n.s.
Peer Utilization	n.s.	1.78 ^c
Self-Concept Confusion		
(TSCS total conflict)	-2.42 ^d	-1.76 ^c

^a*df* = 55 except for Peer Utilization (*df* = 31).^b*df* = 40 except for Peer Utilization (*df* = 25).^c*p* < .05 (one-tailed).^d*p* < .01.^e*p* < .001.

ing that members of the LS group indicated they actually desired significantly less sharing of serious concerns than was indicated by members of the HS group ($t = 2.55$, $df = 55$, $p < .01$).

Among the peer attachment classification groups, the HS group was significantly higher in self-esteem and life-satisfaction and lower on the four affective status measures than the LS group. The mean self-esteem scores of the HS and LS Peer groups were 370 and 334, respectively. Peer Utilization but not Mother or Father Utilization differentiated the peer attachment groups from each other. The HS Peer group did report more frequent sharing of both everyday and serious concerns than the LS group ($t = 1.64$, $df = 40$, $p < .06$; $t = 3.08$, $df = 40$, $p < .005$). The LS peer group, similarly to the LS parent group, reported that they desired less sharing of serious concerns ($t = 2.37$, $df = 40$, $p < .025$).

A comparison made between parent attachment group placements and peer-group placement revealed good correspondence. Of the 29 subjects whose IPPA score patterns were classifiable in terms of both peer and parent attachment category, 21 (72%) were either HS or LS in their attachment to *both* peers and parents. Forty-five percent of subjects assigned to the HS parent-attachment group were also assigned to the HS peer-attachment group (comprising two-thirds of the HS peer group), while only 16% were assigned to the LS peer-attachment group. Most subjects (62%) in the LS parent group were not categorized in terms of their attachment to peers. Seven (27%) were also classified as LS in their attachment to peers, and only three subjects were classified as HS to peers.

Table VIII. Correlation Coefficients for Negative Life-Change and Psychological Symptomatology (Controlling for Parent and Peer Attachment Scores)

	High security group		Low security group	
	Parent (<i>n</i> = 31)	Peer (<i>n</i> = 23)	Parent (<i>n</i> = 26)	Peer (<i>n</i> = 20)
Depression/Anxiety	-.11	.09	.59 ^a	.29
Resentment/ Alienation	-.08	.09	.57 ^a	.30
Irritability/Anger	-.27	.12	.61 ^a	-.01
Guilt	-.02	-.34	.60 ^a	.08

^a*p* < .01 (one-tailed).

The third major hypothesis of this study concerned a greater association between negative life change and psychological symptomatology for the LS attachment groups than for the HS groups. Correlations were obtained between degree of negative life change and measures of affective status for the HS the LS attachment groups. Because Parent and Peer Attachment scores were known to be moderately related to the variables examined in this analysis, the common variance was removed. As shown in Table VIII, a pattern of moderate partial correlation coefficients emerged for the LS parent group, in contrast with generally low coefficients for the HS parent group. The analysis of the two peer attachment groupings suggested no difference between the HS and LS groups in the relationship between negative life change and symptomatology. The possibility was investigated that the HS and LS groups differed in the degree of negative life change experienced. The LS parent attachment group reported significantly more negative life change than the HS group ($t = 2.04$, $df = 55$, $p < .05$, two-tailed), but no difference was found for the two peer groups.

Discussion

As hypothesized, quality of parent and peer attachments in late adolescence was highly related to well-being, particularly to self-esteem and life satisfaction. This finding is congruent with the results of a number of studies linking psychological adjustment to the quality of intimate relationships with parents and peers. Importantly, quality of attachment not only was strongly related to well-being, but also meaningfully contributed to predicting the adolescents' depression/anxiety and resentment/alienation scores. These findings are congruent with Bowlby's hypothesis (1973b) regarding the relationships between attachment, and anxiety and depression. According to a hierarchical regression model, quality of attachment to parents was signifi-

cantly related to the criterion measures after quality of peer attachment and negative life change had been controlled.

Thus, it appears, even in a college-aged population, the present perception of family relationships continues to be linked with well-being. This finding is congruent with that of Mortimer and Lorence (1980), who reported significant influences of family relationships on self-esteem in a college population. While the IPPA taps aspects of current relationships with parents, studies have indicated that parent-child relationships are quite stable through childhood and adolescence (Crandall, 1972; Hunt and Eichorn, 1972), and that there is continuity in child-rearing orientations of both parents (Roberts, Block, and Block, 1984). Such data are congruent with Bowlby's (1969/1982) thesis that, barring major discontinuities in experience, quality of attachment is enduring.

In this study, a partial classification scheme was devised in order to compare late adolescents according to the differential nature of their attachments. Adolescents with attachments marked by high security to their parents appear very well adjusted. They possess higher than average self-esteem, and enjoy frequent and satisfactory communication with their families. Almost half of these subjects also reported a high quality to their relationships with peers. In contrast, subjects comprising the LS parent attachment group described feelings of resentment and alienation, and a more emotionally and verbally detached quality to their relationships with their parents.

While negative life change was independently related to well-being in this study, the results indicate considerable discrepancy between those adolescents securely attached to parents and those with low security in the strength of association between negative life change and symptomatology. This pattern was not evident for the two categories of peer attachment. Such data, although necessarily tentative due to the low *ns*, suggest that those adolescents characterized by low security to parents may be more vulnerable to the deleterious effects of such damage on well-being. These findings are consonant with Greenberg *et al.*'s (1984) data suggesting a moderating effect of positively perceived attachment to parents but not to peers, for their sample of 12- to 19-year-olds. Together, these results, contrary to Gad and Johnson's negative findings (1980), contribute toward substantiation of a buffering role of parental relationships in adolescence. Such a role is predicted by Bowlby's theoretical formulations (1969/1982), providing evidence for one mechanism by which attachment may maintain its hypothesized enduring relationship to quality of adaptation. However, as Thoits (1982) cautions, only longitudinal data can address the causal question implicit in the buffering hypothesis.

The method of comparison of individual differences in adolescent attachment should be considered exploratory. First, the dimensionality of adolescent attachment remains open to question. Possibly, a more heterogene-

ous item content would result in better confirmation of our hypothesis of affective/cognitive and behavioral dimensions. The superiority of this categorization method over the use of linear scale scores on a single dimension of security remains to be proven. The attachment groups formed in this study were based on relative criteria, determined by the characteristics of one sample of late adolescents (college students). The variability of self-esteem scores and the ranges of the IPPA scores do suggest that differentiation of subjects was adequate for limited generalizability of findings within late adolescence. With our conceptual analysis, however, 34% of the sample for parent attachment and 51% for peer attachment were not categorized. While we have characterized a somewhat extreme subsample as LS, more than one pattern of insecure attachment may be discriminable. It is not clear what the development manifestations of "avoidant" or "ambivalent" attachment would be in adolescence, or if other conceptualizations of insecure attachment would be more appropriate. Furthermore, these categories are only comparative in nature, denoting more secure vs more insecure.

The IPPA has shown substantial reliability and good potential validity as a measure of perceived quality of close relationships in late adolescence. Further development with younger adolescents is planned. Construct validity remains to be demonstrated through the clinical assessment of adolescents' psychological functioning (rather than self-report methods). One question that might be raised regards the validity of findings resulting solely from self-report measures. While multimethod investigations will provide necessary corroboration of these findings, the pattern of results provides evidence to support their validity. First, there is a relatively low correlation between self-reported quality of relationships to parents and that to peers. Thus, there does not seem to be a plaintive set with individuals reporting homogeneously across two different types of attachment figures. Second, as hypothesized in this study, differential associations were found between outcome measures and security of attachment to peers vs parents. Behavioral observation of adolescents' interactions with their parents and peers are also needed to further validate the IPPA. Hauser and his associates (Hauser, Powers, Noam, Jacobson, Weiss, and Follansbee, 1984) have recently developed an observational method for identifying interactions within families including adolescents (Constraining and Enabling Coding System), which may be useful in this regard.

The comparisons of attachment groupings based on patterns of subscale scores represents an advance toward fuller understanding of individual differences, beyond that provided by linear scale scores. Following the development of an improved method of classification, several avenues of investigation seem particularly warranted. First, in light of Main and Weston's (1981) and Lamb's (1977) infant studies providing evidence for differential qualities of attachment to mothers and fathers, we were currently expanding

the IPPA to separately assess mother and father attachment in adolescence. By doing so, questions may be examined regarding the effects of discordant attachments to these figures on well-being and the disposition to form secure or insecure peer relationships, as well as their differential relationship to the working model of the self (Bowlby, 1980). Further exploration in this area may help explain the present findings that adolescent subjects with LS parent attachment showed more confusion and contradiction in their "self-system" (Epstein, 1980).

Second, the importance of parent vs peer attachment throughout adolescence needs continued investigation. In contrast to Greenberg *et al.*'s (1984) findings of little association between parent and peer affectional attachment, the present results indicate substantial correspondence. There were some individuals, however, who were classified as insecurely attached to parents but securely attached to peers, or vice versa. These groups were too small for meaningful analysis, but deserve future attention—particularly the group comprised of individuals who may be able to "compensate" for poor parental relationships by turning to their peers.

Third, possible sex differences in peer attachment should be explored. Females scored significantly higher on the peer Communication subscale. Hunter and Youniss (1982) report a similar sex difference in adolescent communication. Because females in this study also scored higher on the peer Trust subscale, unless separate criteria for attachment group classification were used (as was done), very few males would have been characterized as securely attached, and few females as insecurely attached. In addition, Bowlby (1973b) has noted a greater occurrence of anxious, clinging attachment in girls while among boys, detachment is more common. Thus, while sex differences in a conceptualization of attachment common to both males and females is an important question (raising the issue of culturally normative socialization mediating attachment formation), separate norms may prove to have great predictive power.

The last suggested avenue for future research is methodological in nature. In order to lend support to Bowlby's reasonable theoretical notion that security of attachment is causally related to well-being, longitudinal data are called for. Such data would also help answer the troublesome question of whether the relationship between attachment and well-being may be explained by the fact that individuals with poorer adjustment perceive their relationships as less satisfactory. Precedential longitudinal research on attachment in early life and on the family-related antecedents of self-esteem in childhood (Coopersmith, 1967; Rosenberg, 1965), however, suggests the appropriateness of a developmental hypothesis of a causal association between parental influence and well-being in adolescence.

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APPENDIX A

Inventory of Parent and Peer Attachment

Respondents indicate whether the following items are *almost always* or *always true*, *often true*, *sometimes true*, *seldom true*, or *almost never* or *never true*.

Section I

1. My parents respect my feelings.
2. I feel my parents are successful as parents.
3. I wish I had different parents.
4. My parents accept me as I am.
5. I have to rely on myself when I have a problem to solve.
6. I like to get my parents' point of view on things I'm concerned about.
7. I feel it's no use letting my feelings show.
8. My parents sense when I'm upset about something.
9. Talking over my problems with my parents makes me feel ashamed or foolish.
10. My parents expect too much from me.
11. I get upset easily at home.
12. I get upset a lot more than my parents know about.

13. When we discuss things, my parents consider my point of view.
14. My parents trust my judgment.
15. My parents have their own problems, so I don't bother them with mine.
16. My parents help me to understand myself better.
17. I tell my parents about my problems and troubles.
18. I feel angry with my parents.
19. I don't get much attention at home.
20. My parents encourage me to talk about my difficulties.
21. My parents understand me.
22. I don't know whom I can depend on these days.
23. When I am angry about something, my parents try to be understanding.
24. I trust my parents.
25. My parents don't understand what I'm going through these days.
26. I can count on my parents when I need to get something off my chest.
27. I feel that no one understands me.
28. If my parents know something is bothering me, they ask me about it.

Section II

1. I like to get my friends' point of view on things I'm concerned about.
2. My friends sense when I'm upset about something.
3. When we discuss things, my friends consider my point of view.
4. Talking over my problems with my friends makes me feel ashamed or foolish.
5. I wish I had different friends.
6. My friends understand me.
7. My friends encourage me to talk about my difficulties.
8. My friends accept me as I am.
9. I feel the need to be in touch with my friends more often.
10. My friends don't understand what I'm going through these days.
11. I feel alone or apart when I am with my friends.
12. My friends listen to what I have to say.
13. I feel my friends are good friends.
14. My friends are fairly easy to talk to.
15. When I am angry about something, my friends try to be understanding.
16. My friends help me to understand myself better.
17. My friends are concerned about my well-being.
18. I feel angry with my friends.
19. I can count on my friends when I need to get something off my chest.
20. I trust my friends.

21. My friends respect my feelings.
22. I get upset a lot more than my friends know about.
23. It seems as if my friends are irritated with me for no reason.
24. I tell my friends about my problems and troubles.
25. If my friends know something is bothering me, they ask me about it.

APPENDIX B

Factor Loadings of Parent Attachment Items^a

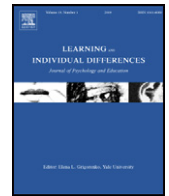
Item	Factor I: Communication	Factor II: Trust	Factor III: Alienation
1	364	714	-203
2	432	545	-251
3	238	505	-217
4	174	680	-394
5	-423	-019	470
6	583	308	-218
7	491	213	-300
8	611	203	-127
9	-274	-377	447
10	130	411	-457
11	-143	-383	519
12	-216	-217	552
13	324	650	-241
14	258	718	-207
15	-544	023	551
16	604	450	-304
17	726	268	-322
18	-063	-417	522
19	-330	-297	467
20	742	380	-127
21	443	470	-453
22	-186	-244	541
23	401	605	-281
24	405	521	-193
25	-332	-352	644
26	675	371	-276
27	-240	-193	656
28	605	306	-269

^aOrthogonal analysis with factors limited to three, performed on final set of items. Decimals omitted.

Factor Loadings of Peer Attachment Items^a

Item	Factor I: Trust	Factor II: Communication	Factor III: Alienation
1	312	542	049
2	236	605	-166
3	432	484	-142
4	-246	-123	552
5	527	216	-219
6	386	457	-292
7	219	645	-174
8	537	298	-280
9	096	204	474
10	-144	-099	531
11	-398	-191	454
12	610	424	-141
13	678	341	-229
14	577	339	-306
15	602	396	-187
16	205	560	-147
17	443	547	-041
18	-073	-185	450
19	547	480	-110
20	749	206	-027
21	720	295	-148
22	-070	-287	494
23	-301	-115	518
24	300	708	-155
25	312	701	-191

^aOrthogonal analysis with factors limited to three, performed on final set of items. Decimals omitted.



The relationship between academic self-concept and achievement: A multicohort–multioccasion study

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ARTICLE INFO

Article history:

Received 26 October 2011

Received in revised form 6 April 2012

Accepted 29 July 2012

Keywords:

Achievement

Adolescence

Development

Self-concept

Structural equation modeling

ABSTRACT

Marsh and Köller (2004) combined the reciprocal-effects model and the internal/external frame-of-reference model into a unified model of relationships between academic self-concept and achievement. However, this model has only been examined with German adolescents. We decided to test this model with two-wave data drawn from a national survey of Taiwanese students. We found that reciprocal effects exist for both math and Chinese for the high-school students. However, the causal relationship of academic self-concepts and achievement for pre-adolescents seems to vary depending on school subject. Moreover, the causal effects from academic achievement decline with age, whereas those from academic self-concepts increase with age, suggesting a developmental trend. The negative cross-domain effect from prior achievement to subsequent academic self-concept is not strong in the unified model.

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1. Introduction

In educational psychology, academic self-concept is a significant construct that has stimulated extensive research. A positive academic self-concept is beneficial, particularly for motivating individuals to improve their academic performance (Marsh, 2007). Both the reciprocal-effects model (Marsh, Byrne, & Yeung, 1999) and the internal/external frame of reference (I/E) model (Marsh, 1986) depict the relationship between academic self-concept and achievement. The former model proposes that academic achievement and self-concept reciprocally influence each other, while the latter model claims that achievement positively affects an individual's academic self-concept in the same domain but negatively affects self-concepts in other domains. Marsh and Köller (2004) unified the two models to simultaneously address the causal relationships between academic self-concept and achievement across distinct domains. In the present article, we use “the unification model” (Chien, Jen, & Chang, 2008) to describe this model.

Research on the reciprocal-effects model and the I/E model has been performed in different countries and in cross-national comparisons (Chiu & Klassen, 2009; Lee, 2009; Marsh & Hau, 2004; Marsh, Hau, & Kong, 2002; Marsh, Kong, & Hau, 2001). However, the

unification model has only been studied in German adolescents (Marsh & Köller, 2004). Students from East Asian countries have been found to have poorer mathematics self-concepts but higher standardized mathematics test scores compared to those in Western countries (Kung, 2009; Wilkins, 2004). To provide external validity and to gain insight into the causal relationships of academic self-concepts and achievement within domains or cross-domains, the present study evaluated the unification model using a research design that combined the advantages of cross-sectional and longitudinal research within the same study (Marsh et al., 1999). The sample included 5th grade preadolescents and 10th grade adolescents in Taiwan, with data collected in 2 consecutive years for each group.

2. Theoretical background

2.1. Causal ordering of academic achievement and self-concept

In a classic article concerning the causal ordering of academic achievement and self-concept, Calsyn and Kenny (1977) compared the self-enhancement model and the skill-development model (see also Scheirer & Kraut, 1979; Skaalvik, 1997). According to the self-enhancement model, academic self-concept is a determinant of academic achievement, and enhancing academic self-concept improves academic performance. In contrast, the skill-development model suggests that academic self-concept is a consequence of achievement, and the best way to enhance academic self-concept is to improve achievement skills. Both the self-enhancement and skill-development models are based on either-or logic (Marsh, 2007). A compromise between the self-enhancement model and the

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skill-development model is the reciprocal-effects model: prior academic self-concept affects subsequent achievement and prior achievement affects subsequent academic self-concept. Research studies have provided support for the reciprocal-effects model (Marsh & Yeung, 1997; Marsh et al., 1999).

The causal relationship of academic self-concept and achievement differs with age. According to Marsh (1990b), the academic self-concepts of young children are not highly associated with external indicators, such as grades or teachers' ratings. However, as they grow older, children learn their relative strengths and weaknesses such that domain self-concepts become more differentiated and more highly correlated with external indicators. In an evaluation of domain self-concept, Marsh, Craven, and Debus (1998) reported that the reliability, stability, and factor structure of academic self-concept scales improved as children grew older, indicating that academic self-concepts become more firmly established and stable with age. Skaalvik and Hagtvet (1990) also advocated that the relationship between achievement and academic self-concept likely becomes reciprocal when ability perceptions are well developed. Researchers supporting this developmental perspective include Skaalvik (1997) and Chapman and Tunmer (1997). Chapman, Tunmer, and Prochnow (2000) noted that academic self-concept is developed based on previous experiences with learning; not all young children's academic self-concepts are pre-determinants of subsequent achievement.

To examine the developmental perspective, Guay, Marsh, and Boivin (2003) conducted a multicohort-multioccasion study based on samples from Grades 2, 3, and 4 and found support for the reciprocal-effects model over different age cohorts. In contrast to previous research (Chapman & Tunmer, 1997; Skaalvik, 1997), Guay et al. (2003) reported the existence of a link from prior academic self-concept to subsequent achievement for young elementary children. Another study of elementary school students found a reciprocal relationship between academic achievement and self-concept, although the effect of academic achievement on academic self-concept was stronger than the effect of academic self-concept on academic achievement (Muijs, 1997). Helmke and van Aken (1995) also supported the reciprocal-effects model when either test scores, school marks, or a mixture of the two were used as achievement indicators for elementary-school students.

Although there is strong support for the generalizability of reciprocal effects to pre-adolescents and adolescents (Kurtz-Costes & Schneider, 1994; Marsh, 2007; Marsh, Trautwein, Lüdtke, Köller, & Bauert, 2005), Skaalvik and Valas (1999) provided support only for the skill-development model based on three cohorts (Grades 3, 6, and 8). Byrne (1998) found support for the skill-development model among high-school students for both general academic and mathematics achievement and self-concept.

2.2. Internal/external frame of reference (I/E model)

According to the I/E model, academic self-concept in a particular domain is formed in relation to two comparison processes or frames of reference. One is the external reference in which students compare their self-perceived performances in a particular domain with the perceived performances of other students in the same domain. If they perceive themselves as able compared to other students, then they should have a high academic self-concept in that domain. The other comparison process is an internal reference in which students compare their own performances in one particular domain with their own performances in another domain. For example, students who are more capable in mathematics than in verbal are likely to have higher mathematics self-concepts. The joint operation of these processes, depending on their relative weights, results in the small or nonexistent correlation between mathematics and verbal self-concepts.

The I/E model was extended in many ways. Möller and Savyon (2003) included non-academic domains in the model and found that academic achievement negatively influences such non-academic self-concepts as honesty. Goetz, Frenzel, Hall, and Pekrun (2008) used an extended I/E model to argue that the achievement effect on academic enjoyment in specific domains is mediated by domain self-concept. There is also support for the generalizability of the I/E model where verbal self-concept is for a native language other than English (e.g., Norwegian: Skaalvik & Rankin, 1995; Chinese: Marsh et al., 2001; Yeung & Lee, 1999; German: Brunner, Lüdtke, & Trautwein, 2008) and where academic self-concept is for a domain other than mathematics (Marsh et al., 2001; Möller, Strebblow, Pohlmann, & Köller, 2006).

Studies investigating various age groups and employing different measures of achievement have consistently confirmed the I/E model (Marsh, 1990a). Möller, Pohlmann, Köller, and Marsh (2009), who performed a meta-analysis based on 69 data sets from past studies, found considerable support for the I/E model, and the I/E model was found to be valid for different genders. When the generalizability of the I/E model was examined longitudinally, it was found to be stable over time (Marsh et al., 2001). Experimental studies that manipulated the feedback to an individual's mathematics and verbal performances also supported the existence of internal comparison (Möller & Husemann, 2006; Möller & Köller, 2001; Pohlmann & Möller, 2009).

2.3. Unification of the reciprocal-effects model and the I/E model

Marsh and Köller (2004) combined the reciprocal-effects model and the I/E model into a unified model that incorporates the strengths of each model. In the past, tests of the I/E model have typically been based on a single wave of data, which focuses on the influences of mathematics and verbal achievement on mathematics and verbal self-concepts, particularly the negative effect of achievement in one domain on self-concept in the other. However, the reciprocal-effects model has typically been studied based on a single academic domain. Even for studies that evaluated causal models for more than one domain, separate analyses were conducted for each domain (Marsh & Yeung, 1997; Shavelson & Bolus, 1982). Therefore, the potential limitations of each model have been compensated by reconciling the reciprocal-effects model and the I/E model.

A test of the unification model presented in Fig. 1 would determine whether the cross-domain effect existed across two time periods (i.e., whether prior achievement in a domain influenced the subsequent academic self-concept in another domain) when controlling for covariance due to correlations of the subsequent academic self-concept with the prior academic self-concept and achievement within the domain. In addition, a test of this model would determine the extent of reciprocal effects while controlling for the correlations among self-concept and achievement between domains in one time period and the influence of the self-concept or achievement in the other domain. According to Marsh and Köller (2004), the influence of prior self-concept in one domain to subsequent achievement in another domain is very weak (close to zero) or negative.

3. The present study

The goal of the present study was to determine whether the unification model applied to a 5th grade preadolescent cohort and 10th grade adolescent cohort of students in Taiwan, and to determine the difference in the causal relationships between academic achievement and academic self-concept for the two cohorts. In Taiwan, the academic self-concepts of 5th grade students and 10th grade students are at different stages of formation. Students in 5th grade experience little academic pressure, while 10th grade students have taken a competitive high school entrance exam and have begun to prepare for a college entrance exam that they will take in two years. Comparing these two groups provided insights into how students develop

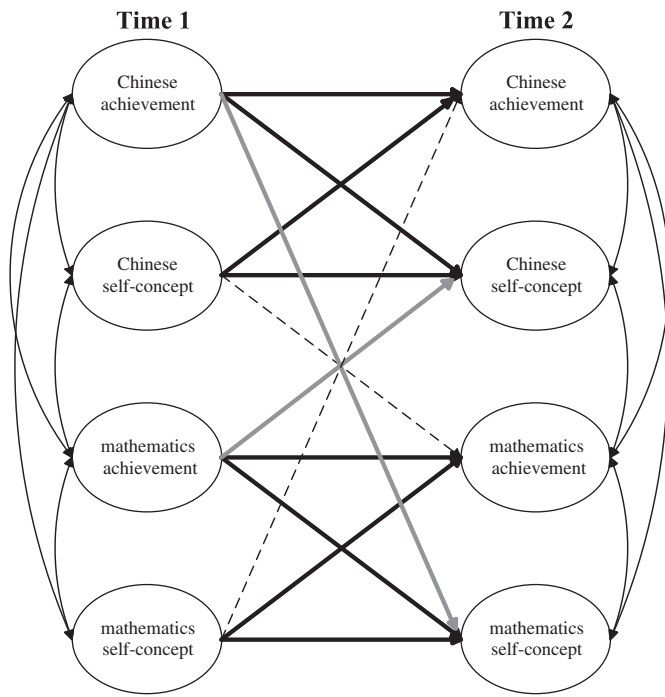


Fig. 1. Unification of the reciprocal effects model and the internal/external frame of reference model. Note. Black lines represent positive relationships; grey lines represent negative relationships; dashed lines represent close to zero or negative relationships.

academic self-concepts at two different stages of schooling and the extent to which academic self-concept and achievement reciprocally influenced each other.

In the research model presented in Fig. 1, the upper component depicts the original reciprocal-effects model for Chinese, and the lower component depicts the model for mathematics. The reciprocal-effects model is represented by the black lines; the effects of prior mathematics achievement on the Chinese self-concept and prior Chinese achievement on the mathematics self-concept are represented by the grey lines; and the effects of prior self-concepts on achievement in other domains are represented by dashed lines. Although Marsh and Köller (2004) proposed a two-wave model, their research employed a five-wave model. The present study adopted the simpler two-wave model (Marsh & Köller, 2004).

The present study addressed the following specific research questions:

- Would the unification of the reciprocal-effects and internal/external frame-of-reference models fit the data for 5th grade and 10th grade students in Taiwan?
- Would the causal relationships between academic self-concepts and achievement proposed by the unification model differ for the 5th grade and 10th grade cohorts?

4. Method

4.1. Participants and procedure

The study employed a multicohort–multioccasion design that combined the advantages of cross-sectional and longitudinal research (Marsh et al., 1999) to investigate the relationship between self-concept and achievement for Chinese and mathematics in a two-wave panel study with two different cohorts. Participants were drawn from respondents of a national survey of adolescents funded by the Republic of China (ROC) National Academy for Educational Research. Regional clusters (northwest, midwest, southwest, and east/islands) were classified using the official Taiwan territorial

divisions. The number of participating schools and students in each region were based on the 2006 educational statistics published by the ROC Ministry of Education (n.d.). Participating schools in each region were randomly selected, and one class was randomly selected from each school. The sample consisted of 782 elementary and high school students who were in 5th grade (Cohort 1, $n=380$) and 10th grade (Cohort 2, $n=402$) in 2007 (Time 1) and in 6th and 11th grade in 2008 (Time 2).

4.2. Measures

We used four indicators (academic self-concepts and achievement for Chinese and mathematics) in the unification model.

4.2.1. Academic self description questionnaire II (ASDQ II)

Academic-self-concept data were collected using the ASDQ II (Marsh, 1990a), which consists of subscales that assess students' perception of their achievement in a specific academic area. Chinese versions of the ASDQ II for the domains of Chinese language and mathematics studies were constructed. Each scale consisted of 4 items, and the wording of each item was the same across domains, apart from the words describing the domain ("Chinese" or "mathematics"). Participants completing the scales were asked to compare their abilities to those of other students in formulating their responses. Responses to items (e.g., "I get good marks in mathematics," or "Chinese classwork is easy for me") were based on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Cronbach's alpha coefficients at Time 1 were high for both the Chinese ($\alpha=.92$ for both cohorts) and mathematics self-concept subscales ($\alpha=.92$ in Cohort 1; $\alpha=.94$ in Cohort 2). The alpha coefficients also exhibited high reliability at Time 2 for both the Chinese ($\alpha=.94$ in Cohort 1; $\alpha=.92$ in Cohort 2) and mathematics self-concept subscales ($\alpha=.94$ in Cohort 1; $\alpha=.95$ in Cohort 2).

4.2.2. Grades

Participants' Chinese and mathematics grades (ranging from 1 to 100 according to the system used in Taiwan) were obtained from school administrators and converted to T scores so that the grades relative to each class represented the domain performance of individual students.

4.3. Data analysis

The adequacy of model was evaluated using LISREL 8.72 (Jöreskog & Sörbom, 1993). Three fit indices assessed the overall fit of the model: the root-mean-square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root-mean-square residual (SRMR). An RMSEA of .08 or less is considered to be a reasonable fit (Browne & Mels, 1990; Steiger, 1989). CFI values greater than .95 and SRMR values less than .08 were adopted as the criteria for a well-specified model (Hu & Bentler, 1999).

5. Results

5.1. Stability and cross-lagged correlations

Tables 1 and 2 present the factor correlations between the Chinese/mathematics achievement and Chinese/mathematics self-concepts in Cohorts 1 and 2, respectively. Moderate-to-strong stability coefficients of academic self-concept (underlined) and achievement (boldface) were observed for Cohorts 1 and 2 (see Tables 1 and 2, respectively). Although the stability of the academic self-concepts was higher in Cohort 2 than in Cohort 1, achievement was stable in both cohorts. The cross-lagged correlations between achievement and academic self-concept within the same domain were positive and significant for both Chinese and mathematics in Cohorts 1 and 2 (see Tables 1 and 2). However, the

Table 1

Factor correlations between Chinese/mathematics achievement and Chinese/mathematics self-concept in Cohort 1 (N = 380).

Cohort 1 (N = 380)	1. CH	2. CS	3. MH	4. MS	5. CH	6. CS	7. MH	8. MS
Time 1	1. CH	–						
	2. CS	.35**	–					
	3. MH	.78**	.12*	–				
	4. MS	.19**	.04	.45**	–			
Time 2	5. CH	.75**	.26**	.60**	.17**	–		
	6. CS	.27**	.58**	.07	–.10	.26**	–	
	7. MH	.58**	.04	.72**	.44**	.69**	.00	–
	8. MS	.31**	.03	.50**	.67**	.25**	.08***	.46**

Note. Time 1, 2007; Time 2, 2008; CH, Chinese achievement; CS, Chinese self-concept; MH, mathematics achievement; MS, mathematics self-concept.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

cross-lagged correlations between mathematics achievement and Chinese self-concept were non-significant in Cohorts 1 and 2. Inconsistent results were found for the cross-lagged correlations between Chinese achievement and mathematics self-concept, which were statistically significant and positive in Cohort 1 but not significant in Cohort 2.

In summary, the stability of academic self-concepts increased with age, whereas the stability of academic achievement declined with age. Furthermore, positive cross-lagged correlations were found between academic achievement and academic self-concept for the same domain. Although there were inconsistent results for academic self-concept and achievement correlations across domains, the correlations were weak (zero or near-zero) in both cohorts except for the correlation of prior Chinese achievement and subsequent mathematics self-concept in the elementary school sample ($r = .31$).

5.2. Testing the unification model

The present study evaluated the unification model proposed by Marsh and Köller (2004), which included measures of academic achievement and self-concept at Times 1 and 2 (see Fig. 1). Standardized and unstandardized path coefficients in the model for Cohort 1 are presented in Fig. 2. The fit indices indicate that the model exhibited a reasonable fit to the data ($\chi^2_{(152, N=380)} = 426.90$, $p < .001$; RMSEA = .069, CFI = .97, SRMR = .052). Fig. 3 presents the model for Cohort 2, which indicated that the fit indices were within an acceptable range ($\chi^2_{(152, N=402)} = 357.67$, $p < .001$; RMSEA = .058, CFI = .99, SRMR = .072). For Cohort 1, the R^2 values for Time 2 Chinese achievement, Chinese self-concept, mathematics achievement, and mathematics self-concept were .53, .36, .51, and .50, respectively. For Cohort 2, the Time 2 latent variables

Table 2

Factor correlations between Chinese/mathematics achievement and Chinese/mathematics self-concept in Cohort 2 (N = 402).

Cohort 2 (N = 402)	1. CH	2. CS	3. MH	4. MS	5. CH	6. CS	7. MH	8. MS
Time 1	1. CH	–						
	2. CS	.36**	–					
	3. MH	.34**	.15**	–				
	4. MS	–.03	–.17**	.53**	–			
Time 2	5. CH	.58**	.29**	.18**	–.06	–		
	6. CS	.34**	.72**	–.08	–.15**	.34**	–	
	7. MH	.20**	.10	.52**	.43**	.39**	–.11*	–
	8. MS	–.02	–.17**	.46**	.79**	–.01	–.10***	.49**

Note. Time 1, 2007; Time 2, 2008; CH, Chinese achievement; CS, Chinese self-concept; MH, mathematics achievement; MS, mathematics self-concept.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

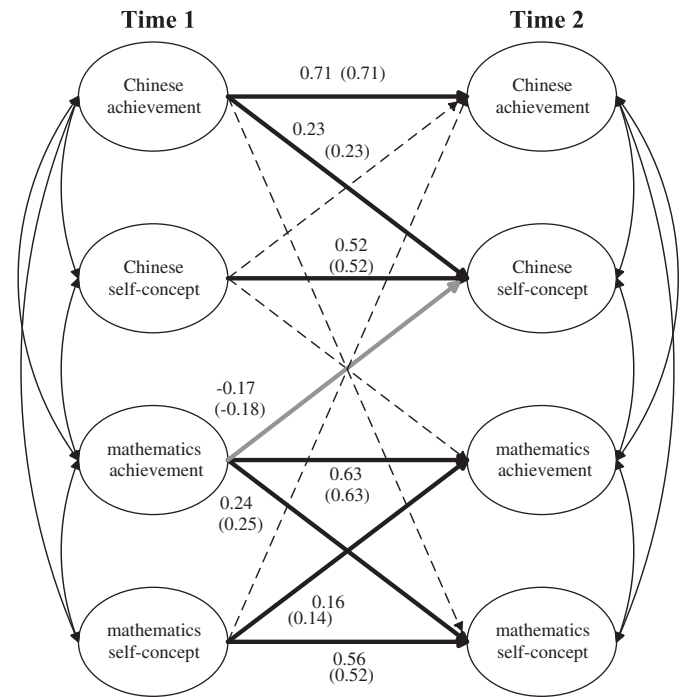


Fig. 2. Unification of the reciprocal effects model and the internal/external frame of reference model in Cohort 1. Note. Black lines represent positive relationships; grey lines represent negative relationships; dashed lines represent zero relationships. Standardized path coefficients and unstandardized path coefficients (in the parentheses) are presented.

exhibited R^2 values of .32, .53, .29, and .62. In general, median total variances in Time 2 latent variables were explained by the model.

The results of the unification model are discussed for the following areas: (a) reciprocal effects, (b) the I/E models, and (c) the cross-domain effects of academic self-concept on subsequent achievement.

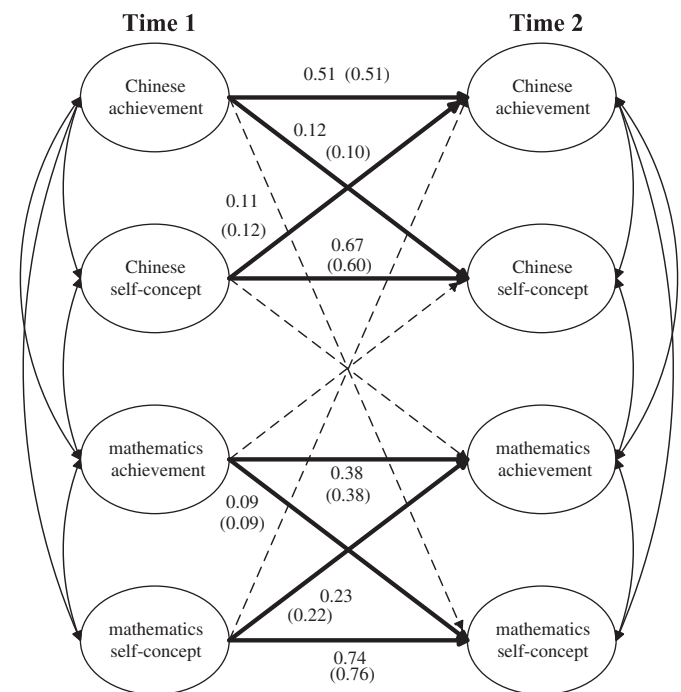


Fig. 3. Unification of the reciprocal effects model and the internal/external frame of reference model in Cohort 2. Note. Black lines represent positive relationships; dashed lines represent zero relationships. Standardized path coefficients and unstandardized path coefficients (in the parentheses) are presented.

5.2.1. The reciprocal-effects model

For Cohort 1, the effect of prior Chinese achievement on subsequent Chinese self-concept was positive ($\beta = .23$, $p < .01$), but the effect of prior Chinese self-concept on subsequent Chinese achievement was not significant (see Fig. 2). Because a strong stability for Chinese achievement ($r = .75$, $p < .001$), the effect of prior Chinese self-concept on Chinese achievement was masked or disappeared when prior Chinese achievement was taken into account. There were statistically significant and positive effects of prior mathematics achievement on subsequent mathematics self-concept ($\beta = .24$, $p < .01$) and of prior mathematics self-concept on subsequent mathematics achievement ($\beta = .16$, $p < .01$).

For Cohort 2 (see Fig. 3), there was a statistically significant and positive effect of prior Chinese achievement on subsequent Chinese self-concept ($\beta = .12$, $p < .01$) and of positive prior Chinese self-concept on subsequent Chinese achievement ($\beta = .11$, $p < .01$). The results also revealed that the prior mathematics achievement positively affected subsequent mathematics self-concept ($\beta = .09$, $p < .05$) and vice versa ($\beta = .23$, $p < .01$).

The influence of prior academic achievement on subsequent academic self-concept was stronger than that of prior academic self-concept on subsequent academic achievement for Cohort 1. For Cohort 2, the results were inconsistent. Although the effect of prior mathematics self-concept on subsequent mathematics achievement was stronger than the influence of prior mathematics achievement on subsequent mathematics self-concept, the effect of prior Chinese self-concept on subsequent Chinese achievement was almost identical to the influence of prior Chinese achievement on subsequent Chinese self-concept.

In summary, consistent with previous research on reciprocal effects, the study results indicated that prior academic achievement influenced subsequent academic self-concept and that prior academic self-concepts affected subsequent academic achievement, although prior Chinese self-concept did not influence subsequent Chinese achievement in the elementary school cohort. In addition, the effects of prior academic achievement on subsequent academic self-concept were stronger than those of prior academic self-concept on subsequent academic achievement in the elementary school students, whereas the opposite effect was found for mathematics in the high school students.

5.2.2. The I/E model

In Cohort 1, a negative cross-effect of prior achievement on self-concept was only found for mathematics ($\beta = -.17$, $p < .05$), and prior Chinese achievement had no effect on subsequent mathematics self-concept (see Fig. 2).

In Cohort 2, the cross-effects of prior achievement on subsequent self-concept in the other domain were not significant for either Chinese or mathematics (see Fig. 3). However, the results of a supplementary analysis that considered only the typical I/E model based on two waves of data collection supported the I/E model.

5.2.3. The effects from academic self-concept to achievement across domains

Consistent with Marsh and Köller (2004), the paths from prior Chinese self-concept to subsequent mathematics achievement and those from prior mathematics self-concept to subsequent Chinese achievement exhibited no effect in either cohort (see Figs. 2 and 3), indicating that earlier academic self-concepts primarily affected subsequent academic achievement in the same domain but not in other domains.

5.3. Comparison across cohorts

A comparison of the unstandardized path coefficients across cohorts (see Figs. 2 and 3) revealed that the effect of prior Chinese

achievement on subsequent Chinese self-concept was stronger for Cohort 1 ($b = .23$) than for Cohort 2 ($b = .10$). In contrast, the effect of prior Chinese self-concept on subsequent Chinese achievement was weaker for Cohort 1 ($b = .02$) than Cohort 2 ($b = .12$). A similar pattern was observed for mathematics. Thus, the effect of academic achievement declined with age, whereas the effect of academic self-concept increased with age.

5.4. Supplemental analysis

Chapman et al. (2000) reported that negative and positive academic self-concepts better predicted subsequent reading skills compared to the average academic self-concept, and that the predictive power of academic self-concept for subsequent achievement differed across subgroups, of students with different academic self-concepts. For elementary school students, the study findings indicated that prior Chinese self-concept did not influence subsequent Chinese achievement. A supplemental analysis of the data in the present study further analyzed the causal relationship of Chinese self-concept to Chinese achievement. Fifth grade students with Time 1 Chinese grades in the middle 50% were divided into two groups (the highest 25% and lowest 25% of the subsample) based on their Chinese self-concept ratings at Time 1. A comparison of the two groups at Time 2 found no significant difference in the Chinese grades of the two groups [$t(99) = .34$, $p = .73$]. Therefore, for preadolescents in Taiwan, average students who exhibited higher or lower Chinese self-concepts achieved similar grades in Chinese in the following year, supporting the finding that prior self-concept in Chinese did not influence subsequent Chinese achievement.

6. Discussion

6.1. The reciprocal-effects model

The present study, which is one of the few cross-cultural research studies on causal relationships between the academic achievement and self-concept for an East Asian student sample, provided important new evidence regarding the generalizability of reciprocal effects in high school students. Marsh et al.'s (2002) study of Hong Kong high school students suggested that academic achievement and self-concept mutually influence each other. However, because their study did not examine younger, elementary school students, investigations that included preadolescents were crucial to provide a more comprehensive understanding of reciprocal effects. The results of the present study found inconclusive evidence of reciprocal effects in older elementary school students because a reciprocal relationship was found for mathematics but not for Chinese. This finding was consistent with the results of Skaalvik and Valas (1999), who found that the reciprocal effects were weaker for older elementary school and middle school students because students' academic self-concepts were still developing and not yet fully established.

In regard to the difference between the results for mathematics and Chinese in the present study, it is possible that mathematics self-concepts but not Chinese self-concepts are established by preadolescence. Dai (2002) noted that because students consider mathematics achievement to be more important for success than Chinese achievement, they appear to develop a stable mathematics self-concept more quickly than a Chinese self-concept. We believe that the parental influence plays an important role in this process. Parents in Taiwan emphasize mathematics achievement because it is considered valuable for future job seekers. As a result, parents and schools focus more on mathematics learning, and their feedback regarding mathematics performance is more salient for students compared to performance in Chinese. Research has indicated that parents' values and expectations are more influential for children's learning in Confucian Asian countries than in Western countries

(Kim & Park, 2006; Wang & Lin, 2005), and children usually adopt parents' expectations and values due to the desire to maintain harmonious relationships with their parents. These cultural factors might explain why the domain differences in reciprocal effects have been reported less often in Western countries. Further in-depth investigations are needed to confirm differences in reciprocal effects for the mathematics and verbal academic domains.

6.2. The I/E model and the cross-effects leading from academic self-concept

For the I/E model incorporated into the unification model, the analysis found that although there was a negative cross-effect of mathematics achievement on subsequent Chinese self-concept in the elementary school sample, academic achievement did not affect academic self-concept in the other academic domain in the high-school sample. These results partially supported the claims of the I/E model. However, negative cross-domain effects for the longitudinal data were found when the effects of other constructs (e.g., the self-concept of the same domain in Time 1) were excluded from the model. This finding suggests that the proposed weak and negative cross-domain effects of prior achievement found for the I/E model were not strong enough to account for the variance of subsequent measures of academic self-concepts shared with more predominantly influential predictors. Future research should replicate this result because findings of the Marsh and Köller's (2004) study supported the model integrating the I/E model with the reciprocal effects model. However, future research investigating differences between the Marsh and Köller (2004) findings and results of the present study should also examine an additional factor. Marsh and Köller's study, which was based on five waves of data collection with brief intervals separating the first four waves that occurred at the end of Grade 6 and the beginning, middle, and end of Grade 7, did not find significant cross-domain path coefficients for achievement between the end of 6th grade and the end of 7th grade. These results suggest that cross-domain effects diminish as the interval between Time 1 and Time 2 increases. The collinearity of the constructs across different waves might also decrease the predictive power of the same construct measured during the later waves. Therefore, future investigations of cross-domain effects should investigate the effect of differences in the time interval between waves.

In regard to the causal effects of self-concept across domains, the study results supported Marsh and Köller's (2004) prediction. Academic achievement primarily explained the same construct in the previous year, and prior self-concept influenced subsequent achievement only in the same domain.

6.3. Comparison across cohorts

With regard to comparisons of the reciprocal effects within the unification model for the two different age groups, the study results revealed that the causal effects of academic achievement declined with age, whereas the causal effects of self-concept increased with age. As Chapman and Tunmer (1997) noted, children's academic self-concepts are not fully developed and the influence of school grades and teacher ratings emerges over time. As children grow older, their academic self-concepts are less influenced by academic achievement as they become more firmly established and stable.

6.4. Limitations

Although Skaalvik and Valas (1999) study of 3rd grade students only supported the skill-development model, Guay et al.'s (2003) methodologically sound investigation provided support for the reciprocal effects model and found no developmental differences for students in Grades 2, 3, and 4, indicating that the effect of academic self-concept was stable for these three age groups. In contrast to

Guay et al. (2003), which only included elementary school students, the present study included groups exhibiting a greater age gap to identify a developmental progression in the causal ordering of achievement and self-concept. Future research should include systematic investigations of students that compare different age groups (e.g., ranging from early elementary school to high school) and employ methodology similar to Guay et al. (2003) and the present study. Moreover, meta-analyses are necessary to provide a more comprehensive understanding of reciprocal effects. Finally, because few studies have evaluated the effects of cultural differences, cross-cultural studies that test the unification model would be worthwhile.

6.5. Conclusion and implication

In summary, the present study made several contributions to academic self-concept research. First, the current investigation is one of the few studies (Marsh et al., 2002) investigating the reciprocal effects of academic achievement and self-concept in an East Asian sample. The study found reciprocal effects for high school students in the academic areas of mathematics and Chinese, indicating that prior academic achievement affected subsequent academic self-concept and that prior academic self-concept influenced academic achievement in adolescents. Mixed results were found for preadolescents. Although reciprocal effects were found for mathematics, study findings supported the skill-developmental model for Chinese, which indicated that the causal relationship between academic self-concept and achievement for preadolescents depended on the academic area. Second, the effect of prior achievement on subsequent self-concept was stronger for preadolescents than for adolescents, whereas the effect of prior self-concept on subsequent achievement was stronger for adolescents than for preadolescents. In other words, the causal effect of academic achievement declined with age, whereas the causal effect of self-concept increased with age, revealing a developmental progression for reciprocal effects. Finally, a more complex longitudinal investigation based on the unification model revealed weaker negative cross-domain effects of prior achievement on subsequent self-concept.

The findings of the reciprocal-effects model have important implications for educators in classroom settings. Enhancing academic self-concepts will not produce lasting effects on academic achievement unless students are also able to maintain good grades. However, academic achievement based on increasing learning in an academic domain will not persist unless the student's academic self-concept is maintained. Therefore, as Marsh et al. (2005) suggest, academic achievement and self-concept should both be fostered. Approaches to fostering achievement and self-concepts should be sensitive to students' age due to the developmental progression of the causal ordering of achievement and self-concept. Teachers of elementary school students should focus on improving students' academic skills to enhance their academic self-concepts and influence future academic achievement. As students reach adolescence, enhancing students' academic self-concepts by improving achievement might be less feasible because academic self-concepts become more stable and less influenced by prior achievement. Moreover, although students who perform well in one domain are typically considered to have good academic self-concepts in all domains and students who perform poorly in one domain are considered to have poor academic self-concepts in all domains, teachers should not assume that academic self-concepts are equivalent across domains (Marsh & Köller, 2004). The I/E model suggests that students who perform well in mathematics may nevertheless have poorer mathematics self-concepts if they perceive that their verbal ability is greater than that of mathematics. Predicting domain self-concept from ability in the domain tends to be more accurate when ability in the other domain is also considered. Although academic self-concept is not

stable for preadolescents, the influence of internal comparisons could persist during the school year. Teachers should be aware of the information based on internal comparisons (Dickhäuser, 2005) and continually assess the extent to which their impression of a student's ability in a given academic area is accurate.

Acknowledgments

This research was funded by the ROC National Academy of Educational Research (NAER-95-24-A-2-01-00-2-14) and the ROC National Science Council through three projects: "The Net and Taiwan Adolescents' Physical and Mental Development" (NSC 97-2631-S-009-001), "Internet use and well-being of Taiwan students: Longitudinal analysis and the extension of fact bank" (NSC-100-2631-S-009-001), and "Internet Use and Its Socio-cultural Impacts on Taiwan Adolescent Students" (NSC 97-2631-S-415-003).

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